


# AGRICULTURAL CHEMICALS

Spraying tobacco  
with maleic hydra-  
zide to inhibit  
sucker growth.  
See story page 46.



## *In This Issue:*

NAC Association Fall Meeting: Fertilizer Round Table •  
Maleic Hydrazide • Does Fertilizer Pay? • ACS Meeting  
Pesticides and Health • New Jersey Fertilizer Conference



**John Powell & Company**  
(Division of Mathieson Chemical Corp.)  
*National Sales Agents for this area*

Florida Agricultural Supply Co.  
in this area.

**Amazing! New!**

**FLY FLAKES**  
(Patent applied for)

# One Million Flies Killed by One Pound of FLY FLAKES!

## SIMPLEST FLY KILLER EVER DEVELOPED.

**EASY—No Spraying—Scatter By Hand**

**DOUBLE ACTION—Kills Maggots too**

**FAST—Kills in minutes**

**FLIES FEAST AND DIE—Contains Attractant**

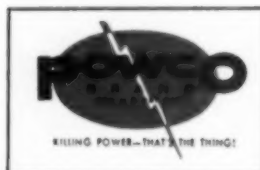
**LASTING—Kills for Days**

**FLIES CAN'T RESIST—Kills DDT-Resistant Flies**

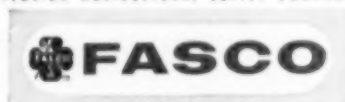
Powell is now setting up a sales distribution system for the entire U. S. except southeastern states. If FLY FLAKES are not available in your area write or wire your closest area office. Available in 25 lb. drums—5 and 10 lb. bags.

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## AGRICULTURAL CHEMICALS



**A Monthly Magazine  
For the Trade**

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This Month's Cover

Aerial Application of maleic hydrazide to a tobacco field to inhibit sucker growth.

OCTOBER  
Vol. 9

1954  
No. 10

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*Serving Industry for 60 Years*

# RAYMOND ROLLER MILL

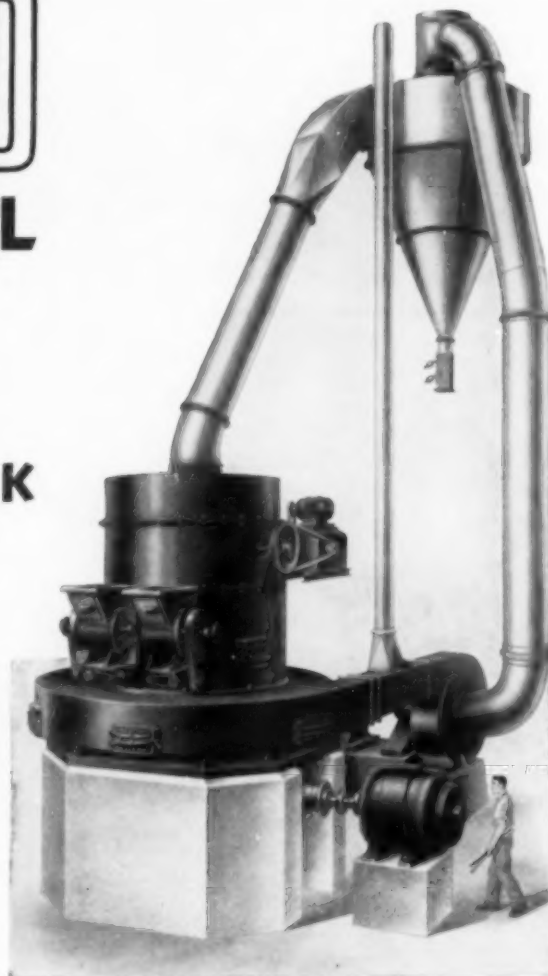
*For Superior Performance in*  
**GRINDING  
PHOSPHATE ROCK**

Raymond leadership in this field has been maintained by continuous improvements in design and construction to insure better products at lower costs.

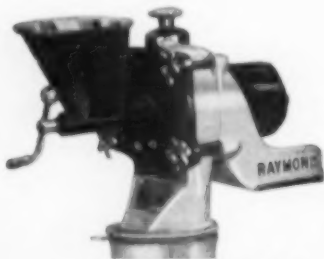
Raymond Roller Mills are noted for their ease of fineness adjustment and consistent uniformity of finished products. Their low ratio of power consumption to tonnage output, as well as their economy of operation and maintenance are important factors in keeping down production costs.

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PRINCIPAL CITIES

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SOIL ESTABDED  
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**Fertilizer  
Borate**  
(HIGH GRADE)

can give you an  
extra ton of Alfalfa  
hay per acre...

BORON DEFICIENT



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in Alfalfa: Lack of boron  
causes plants to become puny  
and dwarfed. Look for yellow  
or reddened top leaves,  
stunted, with growing tips  
rosetted. See close-up photo-  
graph in circle for excellent  
example of boron-starved  
plant characteristics.

See for yourself what Fertilizer Borate, with its high boron content, meant to this alfalfa field. Boron, so vital to alfalfa, is also required by other field crops such as clover, sweet corn, tobacco... and most vegetable and fruit crops. This year, invest a few extra pennies per acre in Fertilizer Borate... the low-cost fertilizer grade of borax... to grow better crops!

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OCTOBER, 1954

7

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 to supply A. & S.  
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ARKELL & SMITHS' customers buy the quality-control and outstanding service developed from close to a century of manufacturing experience.

A&S

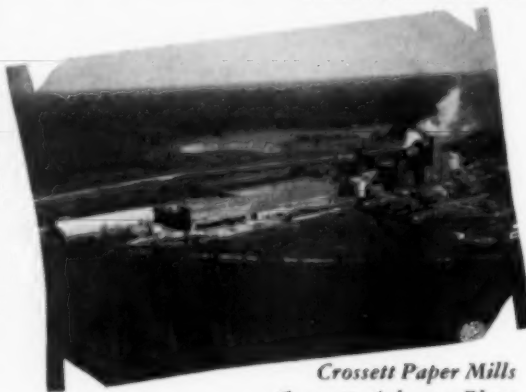
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ground rock phosphate for direct application to the soil.

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OCTOBER, 1954

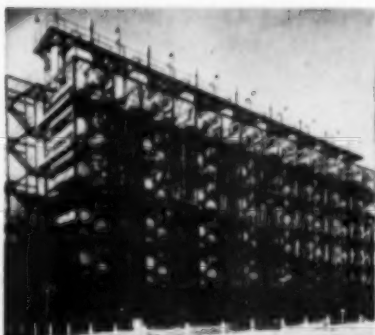


Farmers in the land of 10,000 lakes depend upon this fertilizer plant at Minneapolis for Land O'Lakes brand fertilizer. The distribution area includes also Wisconsin, North Dakota and South Dakota. A division of nationally famous Land O'Lakes Creameries, this fertilizer plant has a total of 13 field service managers.



Mr. Philip F. Stocker is Fertilizer Manager of Land O'Lakes, Minneapolis.

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On time deliveries of SPENSOL solutions have helped to build Spencer's reputation for dependable service to fertilizer mixers everywhere.

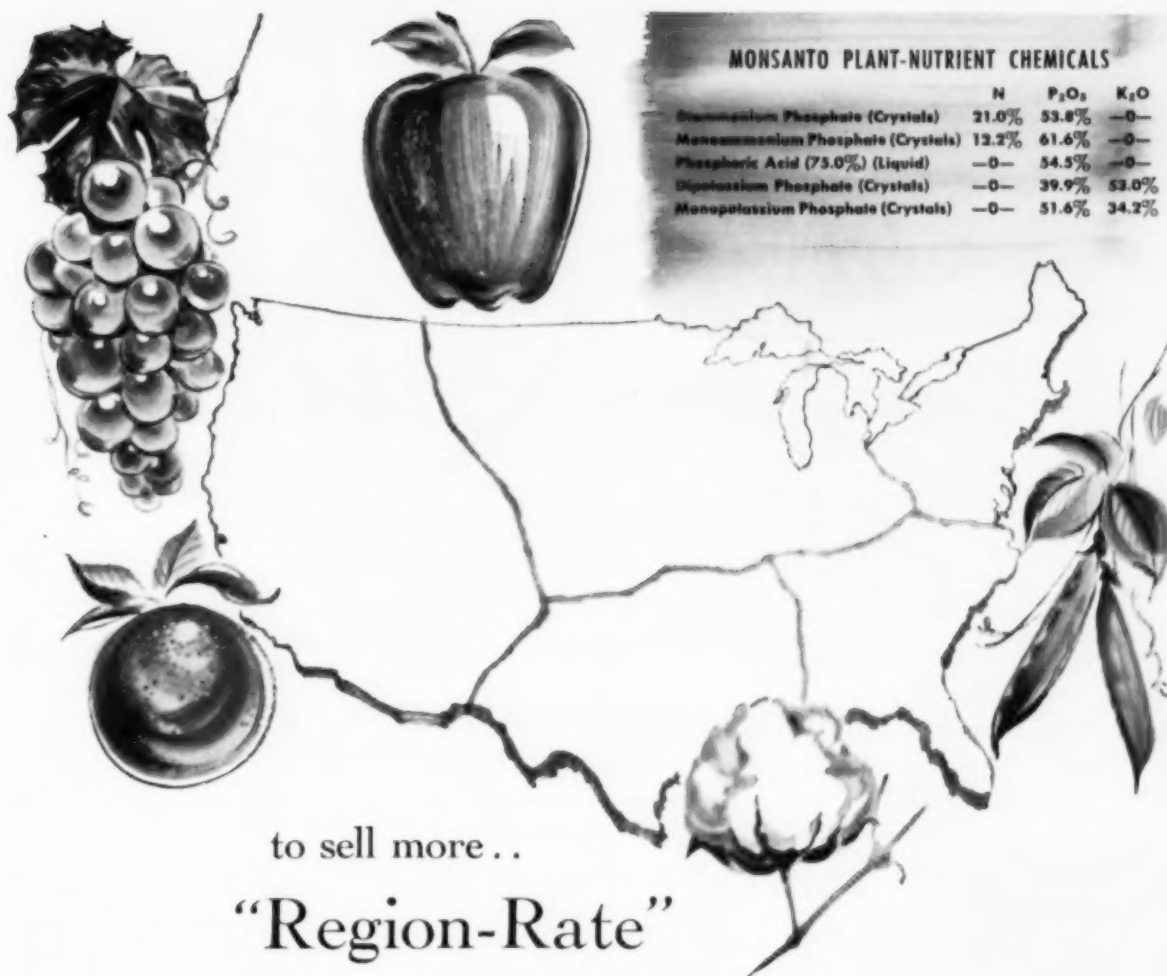


Multi-nozzle solution injector, giving better ammoniation of mixed fertilizer was invented by H. E. Davis of Spencer Chemical Company.



SPENCER CHEMICAL COMPANY, Dwight Bldg., Kansas City 5, Mo. District Sales Offices: Atlanta, Ga.; Chicago, Ill.; Memphis, Tenn.; Works: Pittsburg, Kans.; Henderson, Ky.; Chicago, Ill.; Vicksburg, Miss.; Orange, Texas (under construction).

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your soluble fertilizer

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## **FOR HIGH PRESSURE ACETYLENE DERIVATIVES**

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the following products are among those which will be available in commercial quantities

<b>PROPARGYL ALCOHOL</b> $\text{HC}\equiv\text{CCH}_2\text{OH}$	Three centers of reactivity. Chemical intermediate for pharmaceuticals, agricultural chemicals, etc. Corrosion inhibitor and stabilizer for halogenated compounds.	<b>2-PYRROLIDONE</b> $\begin{array}{c} \text{H}_2\text{C}-\text{CH}_2 \\   \quad \quad   \\ \text{H}_2\text{C} \quad \text{C}=\text{O} \\   \\ \text{N} \\   \\ \text{H} \end{array}$	Polymerizes to high molecular weight, linear, nylon-type, polyamide condensation product. Gives $\gamma$ -aminobutyric acid and derivatives, also N-acyl lactams.
<b>PROPARGYL HALIDES</b> $\text{HC}\equiv\text{CCH}_2\text{X}$	Three centers of reactivity. Chemical intermediate for terpenes and pharmaceuticals, etc. Agricultural uses as soil fumigant, etc.	<b>N-METHYL-2-PYRROLIDONE</b> $\begin{array}{c} \text{H}_2\text{C}-\text{CH}_2 \\   \quad \quad   \\ \text{H}_2\text{C} \quad \text{C}=\text{O} \\   \\ \text{N} \\   \\ \text{CH}_3 \end{array}$	Powerful organic solvent for acrylonitrile polymers and copolymers, cellulose triacetate, etc. Selective solvent for acetylene in natural gas. Spinning agent for polyvinyl chloride solution.
<b>2-BUTYNE-1,4-DIOL</b> $\text{HOCH}_2\text{C}\equiv\text{CCH}_2\text{OH}$	Reacts as a glycol and di-substituted acetylene. Chemical intermediate for solvents, plasticizers, plastics, etc. Corrosion inhibitor and stabilizer for halogenated compounds.	<b>N-VINYL-2-PYRROLIDONE</b> $\begin{array}{c} \text{H}_2\text{C}-\text{CH}_2 \\   \quad \quad   \\ \text{H}_2\text{C} \quad \text{C}=\text{O} \\   \\ \text{N} \\   \\ \text{CH}=\text{CH}_2 \end{array}$	Will copolymerize with almost all vinyl monomers. Permits modification of many properties in existing homopolymers. Gives control of hydrophobic and hydrophilic properties of products.
<b>1,4-BUTANE-DIOL</b> $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$	Reacts as dihydric alcohol. Chemical intermediate for polyesters, polyurethanes, polyamides and cyclic compounds. For use in plasticizers, resins, fibers. Solvent. Humectant.	<b>POLYVINYL-PYRROLIDONE (PVP)</b> $\left[ \begin{array}{c} \text{H}_2\text{C}-\text{CH}_2 \\   \quad \quad   \\ \text{H}_2\text{C} \quad \text{C}=\text{O} \\   \\ \text{N} \\   \\ \text{CH}-\text{CH}_2 \end{array} \right]_n$	Binder, stabilizer, detoxifier, protective colloid, thickener, film former. Physiologically compatible. Wide solubility range. For use in pharmaceuticals, cosmetics, foods, detergents, dye stripping, synthetic fiber additive, size component, lithography, agricultural chemicals, etc.
<b>BUTYROLACTONE</b> $\begin{array}{c} \text{H}_2\text{C}-\text{CH}_2 \\   \quad \quad   \\ \text{H}_2\text{C} \quad \text{C}=\text{O} \\ \diagup \quad \diagdown \\ \text{O} \end{array}$	Powerful organic solvent for polyacrylonitrile, cellulose acetate, polystyrene, etc. Selective solvent for acetylene in natural gas. Chemical intermediate for aliphatic and cyclic compounds.		

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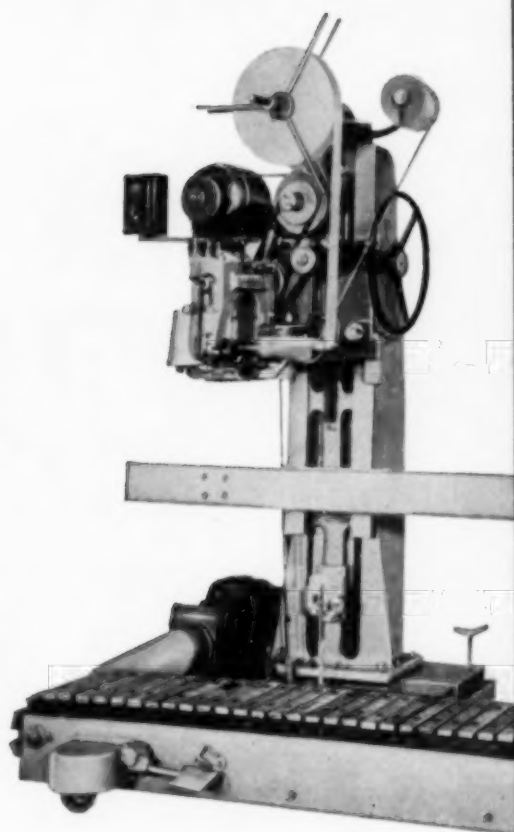
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Plants: Newark, N. J., Houston, Texas



AGRICULTURAL CHEMICALS



model **ET** Bagpaker\*

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**15** bags per minute

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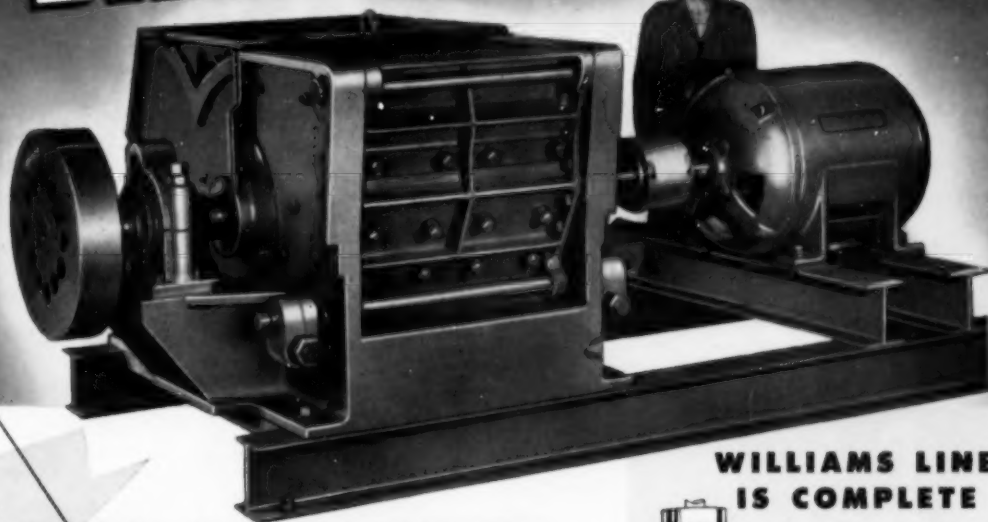
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# WILLIAMS

CRUSHERS

GRINDERS

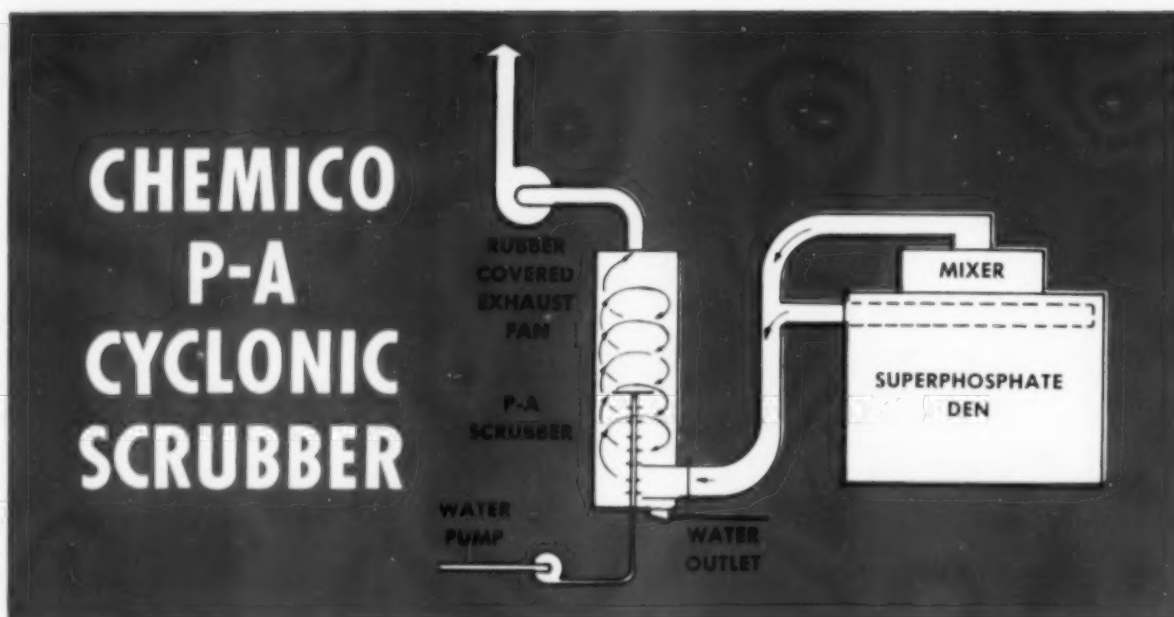
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VERSATILE  
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In Its Field..**



**TOXIMUL 500**, latest member of the Toximul series of agricultural emulsifiers, imparts outstanding spontaneity and emulsion stability, using as little as 3% in many formulations. It performs efficiently with practically all of the major toxicants on the market.

**SOLVENTS . . . TOXIMUL 500** functions well with a wide variety of solvents, and is not as easily thrown off balance by a switch in diluents as are many other commercially available emulsifiers.

**WATER . . . TOXIMUL 500** gives superior emulsification over a wide range of water hardness. In many cases excellent results are obtained all the way from 50-1000 ppm hardness.

**TOXICANT RANGE . . . TOXIMUL 500** gives exceptionally good results with:

*Toxaphene . . DDT . . Aldrin . . BHC . . Chlordane*  
while very satisfactory performance is also obtained with:  
*Dieldrin . . Endrin . . Heptachlor . . Parathion . .*  
*Isopropyl 2, 4D . . Butyl 2, 4D . . BEP 2, 4, 5T*

*For a few specialized systems, other Toximuls are available . . see reverse side for details.*

**PRICE:**

**TOXIMUL 500** combines all these "plus" performance factors with unusually low cost. It is priced at...

**29¢ lb.**  
in truckloads  
**30¢ lb.**  
LTL

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Detergents—  
—Emulsifiers

FOR DETAILED APPLICATION DATA, TURN THE PAGE

**NINOL LABORATORIES, INC.**

1719 SOUTH CLINTON STREET • CHICAGO 16, ILLINOIS • CHESAPEAKE 3-9625

In Canada: Chemical Developments of Canada Ltd., 420 LaGauchetiere Street West, Montreal 1, Quebec

## PERFORMANCE DATA

### EMULSIFICATION OF COMMON PESTICIDE-SOLVENT COMBINATIONS by

# TOXIMUL 500

### IN WATERS OF 50-1000 ppm HARDNESS

PESTICIDES	% TOXIMUL 500	KEROSENE			XYLENE			VELSICOL AR50			HUMBLE AROMATIC			SOVACIDE PD544C		
		50	350	1000	50	350	1000	50	350	1000	50	350	1000	50	350	1000
TOXAPHENE (4 lb.)	3	E	E	E	E	E	P									
TOXAPHENE (6 lb.)	3	E	E	E	E	E	P									
DDT (2 lb.)	3				E	E	P	E	E	E	E	E	E	E	E	E
BHC (1 lb. gamma)	3				G	P	P*	E	E	G	E	E	G	E	E	G
ALDRIN (2 lb.)	4	F	F	F	E	E	E	E	E	E	E	E	E	G	E	E
DIELDRIN (1.5 lb.)	4				E	P	P*	E	E	F	E	E	G	E	E	P
ENDRIN (1.5 lb.)	4				E	E	G	E	E	E	E	E	E	E	E	E
LINDANE (1 lb.)	5				E	E	G	E	E	P	E	E	G	E	E	G
CHLORDANE (8 lb.)	4	E	E	G												
CHLORDANE (4 lb.)	7	G	E	E												
HEPTACHLOR (2 lb.)	5				E	E	F	G	G	E	E	E	E	G	E	G
PARATHION (2 lb.)	8				E	P	P*	E	E	E	E	E	E	E	E	E
MALATHION (5 lb.)	8				G	G	G**	F	F	F**						
ARAMITE (2 lb.)	5				E	E	P	E	E	E	G	G	G	E	E	E
STROBANE (8 lb.)	5				G	G	G									
CHLORO IPC (4 lb.)	10				P	P	P***									
BUTYL 2,4D (4 lb.)	5	E	E	E	E	E	P	E	E	P	E	E	G	E	E	G
ISOPROPYL 2,4D (4 lb.)	5	F	F	G	E	E	G	E	E	G	E	E	G	E	E	G
BUTYL 2,4D-2,4,5T (2 lb.)	5	G	G	G	E	E	G	E	E	G	E	E	G	E	E	G
BEP 2,4,5T (4 lb.)	5	E	P	P	E	P	P	G	G	G	E	E	F	E	E	G

★TOXIMUL 400 gives better results in xylene with BHC, Dieldrin, Parathion; also when ketones are used with Lindane.

★★TOXIMUL MP gives better results with Malathion.

★★★TOXIMUL 250 best for CIPC.

SYMBOLS: E = Excellent = Spontaneous emulsification, no cream 1 hr., no oil 24 hrs.

G = Good = Spontaneous emulsification, cream in 1 hr., no oil 24 hrs.

F = Fair = Fair spontaneity, cream in 1 hr., no oil 24 hrs.

P = Poor = oil on standing.



Detergents—  
—Emulsifiers

... SEE OTHER SIDE FOR FURTHER INFORMATION

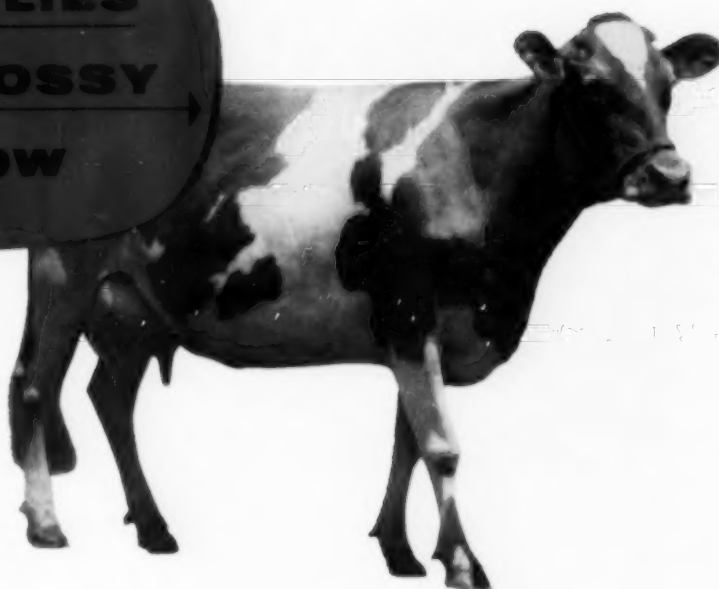
# NINOL LABORATORIES, INC.

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In Canada: Chemical Developments of Canada Ltd., 420 LaGauchetiere Street West, Montreal 1, Quebec



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#### "CRAG" FLY REPELLENT . . .

- . . . repels stable flies, horn flies, house flies, and horse flies . . . protects livestock even during the hot summer months when flies are thickest.
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Fly Repellent

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# UNION SPECIAL\*

Here's dependable, high speed bag closing . . .



*Photo above shows a high production installation of a Union Special Class 20500 Bag Closing machine in a fertilizer plant.*

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News about

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1955 Aerosol pack with

**Good-rite**  
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THE PROVED INSECTICIDE



- Flies
- Mosquitoes
- Gnats
- Silverfish
- Bedbugs
- German Roaches

- House Spiders
- Black Carpet Beetles
- Clothes Moths
- Fleas
- Ants



**I**NTRODUCED early this year, Good-rite Strobane has set a new standard for killing household insects—and is headed for a leading place among insecticides. Developed for use in *aerosol and liquid sprays*, Strobane offers these advantages: no secondary aromatic solvents necessary; pleasant odor; no visible crystalline residue; easy to formulate; excellent stability —will not deteriorate in storage.

\*Terpene Polychlorinates

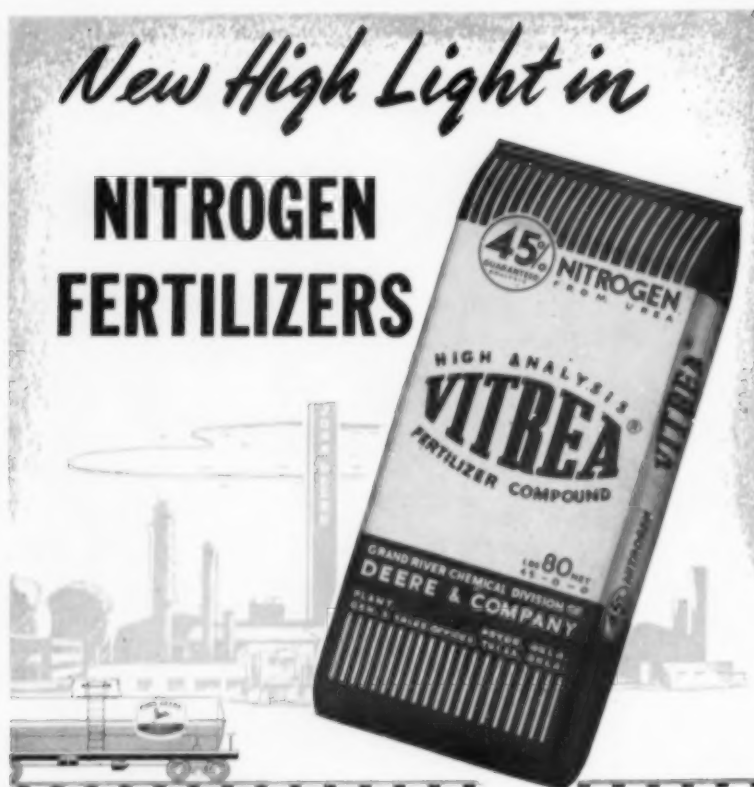
In planning for your 1955 aerosol pack—Good-rite Strobane is the material you can count on for dealer and consumer satisfaction . . . for profitable business . . . *for results!*

For samples and technical information, please write Dept. CB-6, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

**Good-rite**  
Reg. U. S. Pat. Off.

## B. F. Goodrich Chemical Company

A Division of The B. F. Goodrich Company



# New High Light in NITROGEN FERTILIZERS

## VITREA . . . A New High Analysis 45% Nitrogen Fertilizer..From Urea

This new "all purpose" nitrogen fertilizer can be used on all crops . . .

- **EASILY APPLIED BY ANY METHOD**  
... drilling ... top or side dressing ...  
plowing down ... broadcasting ...  
airplane ... or in irrigation systems
- **EXTRA HIGH NITROGEN CONTENT-45%**
- **PRILLED INTO A BEAD-LIKE SHAPE**
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... non-caking and free flowing
- **COMPLETELY SOLUBLE**
- **RESISTANT TO LEACHING**
- **CONVENIENT 80 lb. BAGS**

For your nitrogen needs look to the company famous for quality products for use in agriculture since 1837.

**VITREA**

45%  
NITROGEN

Grand River Chemical Division of

**DEERE • COMPANY**

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## NAC CONVENTION

### Sidelights

**I**N spite of the bleats from here and there about another bad season, it was encouraging to find that upwards of five hundred in the pesticide industry had enough cash or credit left to get to the annual fall meeting of NAC. And they found waiting for them one of the best and most interesting convention programs of recent years. Not content with providing features on the Miller Amendment, antibiotics, sales selection and training, which were enough to guarantee a full and interested attendance at meeting sessions, the committee on arrangements went to all the trouble to card a hurricane . . . "Edna" . . . to fill out the convention bill.

\*\*\*\*\*

The effects of Carol and the advance guard of Edna made the beach and the weather conditions far below the standard for these September get-togethers. The first hurricane removed a big chunk of beach, giving it a cliff-like effect, while the first zephyrs of Edna made things rather damp and gloomy most of the time.

\*\*\*\*\*

Although lots of people got enthusiastic about the steak served at the annual banquet, such gourmets as Hercules Powder Company's Joe Dolson went in for a far more exotic treat. They ferreted out the *piece de resistance* on the luncheon menu of the E & S: "Crisp Wheaties served with sliced bananas and cream."

\*\*\*\*\*

Although he's retired from the Tobacco By-Products Division of Virginia-Carolina Chemical Corp., G. F. "Grub" Leonard, NAC elder statesman, still cuts a mean two-step on the dance floor, as witness the get-together dance in the Essex ballroom.

\*\*\*\*\*

W. R. E. Andrews, Philadelphia, got back at Ag Chemicals flash-bulb poppers with a miniature camera — the size of a cigarette lighter — that fit into the palm of his hand.

(Turn to Page 130)

AGRICULTURAL CHEMICALS



## HERBICIDE

to fit your special needs  
in Lo-Volatile  
ester emulsifiers

Reprinted from "Chemical Week"

**new idea  
mart**

from the **EMULSOL** lab

A thought or two about things new  
and interesting in the field of  
surface-active chemistry . . .



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nomical ones... the oil or  
hormone types formulated  
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are a snap.

Every lo-volatile ester of 2,4-D or 2,4,5-T is unique  
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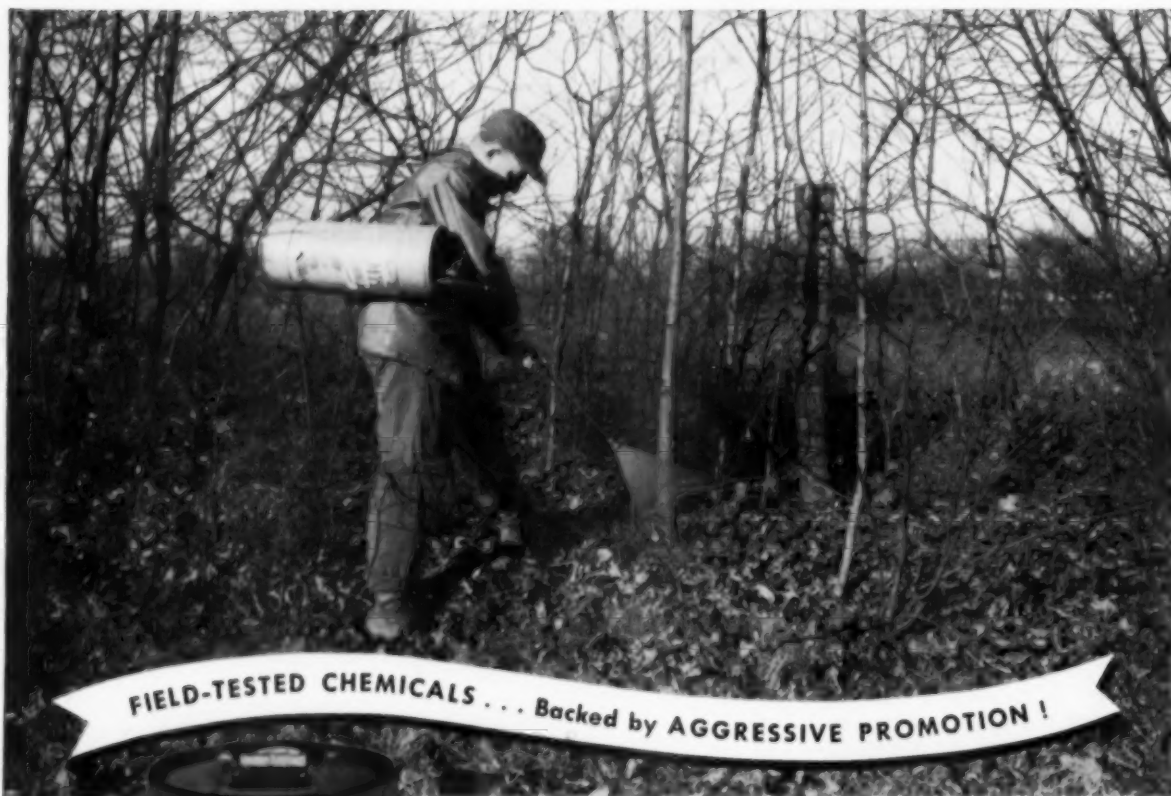
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## *Pittsburgh* BRUSH KILLERS



FIELD-TESTED CHEMICALS . . . Backed by AGGRESSIVE PROMOTION !



Each year, more brush control programs are being conducted in the dormant season. Off-season basal bark application has many advantages. For example, it avoids the danger of damaging growing crops. It distributes labor over the entire year. It requires less equipment than foliage application and it is easier to reach brush in marshy low lands when the ground is frozen.

So be sure you're set to take advantage of these extra off-season sales and profits by having a good stock of Pittsburgh Brush Killers on hand. We'll be glad to send you special newspaper ad mats and window streamers to help you promote dormant season spraying in your area. *Write today!*

WAO 9366

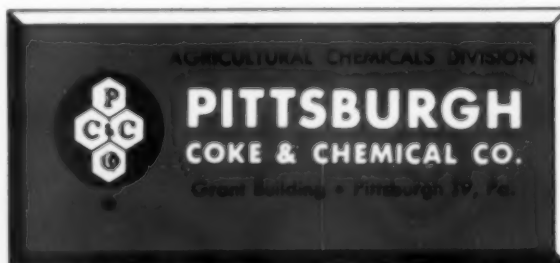
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ORGANIC INSECTICIDES: Benzene Hexachloride, Toxaphene, and DDT.

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WEED KILLERS: 2,4-D Acid, 2,4-D Amine Concentrates, 2,4-D Ester Formulated Concentrates, D4 (Low Volatile 2,4-D Ester), C4 Pre-Emergence Weed Killer, 2,4,5-T Formulations.

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**160**

used by one fertilizer manufacturer\*



**65**

used by one chemical manufacturer\*

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**PAYLOADER®**  
**TRACTOR SHOVELS**  
**than all others combined**



**20**

in one food processor's plants\*



**43**

used by a large steel producer\*



**29**

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MILLIONS OF TONS of bulk materials are handled *daily* by "PAYLOADER" tractor-shovels in all kinds of industries. Sand, clay, coal, chips, chemicals, fertilizers, earth—all manner of materials are scooped up, carried, loaded, dumped, spread, unloaded and piled by these versatile, efficient machines.

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# Chlordane

## For Control of Cattle Lice and Ticks

Chlordane is considered one of the best available insecticides for controlling insect pests of livestock. During the fall and winter months in the United States and Canada, cattle lice and ticks are among the most important pests of the cattle industry. Sprays or dips of Chlordane ranging from  $\frac{1}{4}\%$  to  $\frac{1}{2}\%$  have proven highly satisfactory against these parasites. Excellent seasonal control may be obtained with one application. Write us for literature on the use of Chlordane against cattle lice and ticks.

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AGRICULTURAL CHEMICALS

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\*89.6% of our customers who used L. C. Sleeves and other internal sleeve type bags have switched to KRAFT-lok — without any increase in cost.

The integral construction of this exclusive Kraft Bag feature solves all those tricky closure problems peculiar to bagging granular material.

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## 10 good reasons

why packers of granulated fertilizer prefer KRAFT-lok Bags:

- 1 Eliminates snagging on packer tubes.
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- 3 Prevents torn sleeve particles from contaminating material.
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- 5 Slows up spilling in filling.
- 6 Reduces leakage in closing.
- 7 Actually seals material inside bag automatically.
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- 9 Makes a cleaner, more satisfactory package in all ways.
- 10 Saves dollars all around.



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- 1 Responsibility
- 2 Integrated Plants
- 3 Generations of Bag Experience

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## Key to the uniform, free-flowing chemical fertilizers produced by the Dorrco Granular Fertilizer Process

Successful sales in today's fertilizer market require a high analysis, uniform, free-flowing granular product . . . one that won't compact in storage, clog a spreader or create dust hazards. These valuable characteristics can now be obtained with the Dorrco Granular Fertilizer Process . . . applicable to both new and existing plants. No costly additives or fillers are required, and the product can be shipped direct to wholesaler or farmer in 100% useable form. What's more, the Process is completely flexible in meeting varying marketing demands. It can be used interchangeably to produce triple superphosphate, ammonium phosphates, ammonium sulfate or complete high analysis products.

*In fact, the Process will granulate practically any soluble salt or mixture of salts so as to produce a uniform, free-flowing product.*

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Grace Nitrogen Adds

3

**new counties  
to America's farmland**

Opening this fall in Memphis, Tennessee, is a plant which will produce 72,000 tons of nitrogen annually in the form of urea and anhydrous ammonia. That's enough nitrogen to boost America's corn production by more than 50 million bushels — it's like adding three counties of rich farmland to the nation.

Corn is only one example. Actually, there will be many applications for this nitrogen: as fertilizer for other crops, as a protein source for feed supplements, and for industrial uses like the manufacture of plastics, synthetic fibers, and pharmaceuticals, and in petroleum refining.

The Memphis plant's output provides agriculture and industry a dependable source, backed by a world of experience.

**FOR UREA AND AMMONIA LOOK TO**



**GRACE CHEMICAL  
COMPANY**

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FOR ANY PROBLEM IN PEST CONTROL CONTACT...



Basic suppliers of:

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BHC  
CHLORDANE  
2, 4, 5-T



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OCTOBER, 1954

CELA GMBH. INGELHEIM/RHEIN GERMANY

# Farmers profit 6 ways from plow down



## —with Cyanamid

### "Agriculture's most useful form of nitrogen"

1. Farmers get **MORE HUMUS, FASTER** from cover crops and crop wastes by plowing them down with free-flowing Cyanamid.
2. Cyanamid supplies necessary lime. Cyanamid contains the equivalent of 70% hydrated lime, as well as 20% of the right kind of nitrogen. Farmers need this lime to neutralize soil acidity. And these are the proper proportions of nitrogen and lime to form a maximum of humus from the organic material plowed down.
3. The 20% nitrogen in Cyanamid resists leaching . . . is available to crops from plow down until harvest, come drought or heavy rains. This "staying" quality of Cyanamid nitrogen permits plow down at any time of year.
4. Plow down with Cyanamid places nitrogen in the root zone where it can be used by the plants. It encourages deeper rooting, helps crops withstand drought.
5. Using Cyanamid **AVOIDS** the reduction in yield which often follows plow down of crop wastes and mature cover crops alone.
6. Production costs go down, because Cyanamid eliminates the expense of side- or top-dressing.

MAKE SURE YOU PROFIT, TOO . . . by selling AERO® Cyanamid, Granular—agriculture's most useful form of nitrogen. Every one of the advantages above is a potent sales argument, a convincing reason why Cyanamid for plow down is an agricultural "best seller."

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**AGRICULTURAL CHEMICALS DIVISION**

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ABROTIL® Soil Conditioners

(Also known as MALATHION)

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## Editorial

### COMMENTS

**A**S long time critics of governmental red tape, and particularly of federal bungling in the handling of foreign and all other types of relief, we are glad to take our hats off for a change to an agency which was smart and honest enough to admit it might be wrong,—and then get up and do something about righting the wrong. We refer to the recent decision of the Foreign Operations Administration to amend its bidding rules and give domestic suppliers a fair shake in supplying stocks of fertilizer to be shipped overseas under the FOA aid programs.

Foreign bidders on FOA contracts will now be required to figure in their bids the cost of shipping half their material in U. S. ships. This rather sensible requirement, for some odd reason, applied previously only to American bidders, and resulted in their being put at a serious competitive disadvantage in bidding on these FOA contracts. U. S. Firms will now be able to participate on an equal basis with foreign suppliers, as a result of suggestions by the Senate Appropriations Committee which led to FOA's reversal of its previous bidding set-up.

In retrospect, it seems rather difficult to understand how such an inequitable bidding procedure was established in the first place,—and then allowed to continue as long as it did. It resulted in over eighty percent of FOA fertilizer purchases being supplied by foreign bidders during the year ended April 30, 1954, with more than two-thirds of the material moving in foreign vessels. Perhaps now this picture can be changed.

All credit is due American fertilizer manufacturers, and their trade association representa-

tives, for seeing that attention was called to the inequity of the situation, and demands for relief continued long enough to get action.

\* \* \* \* \*

**A**CLEAN bill of health was accorded to the newer pesticidal chemicals by the Assistant Surgeon General of the United States in his address last month at the NAC convention. "Their record is generally good," he said, adding that "when properly used, insecticides do not cause any diseases or increased susceptibility to disease to either man or animals."

Based firmly on clinical studies, research findings and authenticated mortality records, the opinions of the vast majority of scientists and physicians who have really studied the subject parallel the views of the Surgeon General's office.

We have the resigned feeling, of course, that occasional medical men, perhaps eager for the headlines, and sensation-seeking newspaper stories, will from time to time indict the pesticide industry and accuse pesticides for responsibility for everything from cancer to fallen arches.

All informed authorities, however, seem to unite in the opinion that the industry's record is an excellent one. The important role of pesticides in protecting the national health, and the nation's food supply, far outweighs the occasional case of acute poisoning which is the only legitimate charge that can honestly be laid at the door of the pesticide industry.

## RELATION of PESTICIDES to HEALTH\*

**M**EMBERS of the National Agricultural Chemicals Association are to be commended for the interest which the association has shown in safeguarding human health. Your recognition of the responsibilities that accompany your industrial and technical activities is one of the best guarantees not only of sound growth but of public confidence and trust.

NAC can well take justifiable pride in the way the association has worked with such agencies as the World Health Organization in the development of standards and specifications; with the appropriate departments of government on regulatory, administrative and technical matters; and with producers and consumers on protective measures and general health education.

Products of the industry are of course increasing the yield of world agriculture many times over and are thus helping to swell the food supply for millions of people throughout the world. They are also helping to curb and eliminate diseases which have ravaged many countries and have robbed their people of energy and productive capacity. On the other hand, constant vigilance must be maintained against possible dangers to human health through the unwise or premature or inadequately tested use of chemical compounds.

Insects and rodent pests affect human health both directly and indirectly. They do so in at least three ways: (1) They impair agricultural

productivity with resultant effect on human nutrition; (2) they serve as vectors in the transmission of disease; and (3) they cause untold human discomfort and interfere with physical efficiency.

The magnitude of insect damage to agriculture is well known. It has been estimated that insects cause an annual loss to the United States of \$4 billion; and that \$52 dollars is returned for each dollar spent on insecticides. Insect damage has been estimated at 10 percent, or more, of the total food crop in this country. About 9 percent of all stored food products are ruined by insects, even in countries with well-developed technical services. These losses are of vital concern to public health, particularly in the undeveloped areas of the world. Malnutrition is one of the foremost global health problems. No valid estimate can be made of the enormous amount of disease that is caused by inadequate diets and poor nutrition. Any gains in the production, supply, and storage of food will, of course, have beneficial effects on human nutrition and health.

Insects are the carriers of many diseases which have an important effect on man. The best known of the serious world-wide health problems, is malaria. Other important insect-borne diseases are plague, epidemic typhus, diarrheal infections, dengue, and yellow fever. In addition, there are a host of tropical and semi-tropical diseases which are little known in the United States but which cause considerable suffering and death in many parts of the globe.

Even when they do not carry disease, insect pests are a nuisance and a burden. In some parts of the world, it is almost impossible to work amid the swarms of biting flies and mosquitoes. Sleep and recreation are made difficult. Human efficiency and health are bound to suffer from lowered vitality and resistance.

Pesticides have played and are playing a very significant role in the ecology of man. Their importance to health derives from several important effects. In this discussion, however, I will consider primarily the use of pesticides in combatting disease.

### U. S. Pesticides Aid World Health

**T**HERE are many dramatic examples of the efficiency of some of the newer pesticides in the control and sometimes the eradication, of insect-borne diseases. Although insecticides had been used for many years, it was not until the advent of DDT that any single chemical showed promise of selectively destroying the vector most likely to transmit disease. The "grandad" of the new pesticides, DDT has had the most extensive use and has given rise to a host of famous off-spring. Such major diseases as malaria, plague, and epidemic typhus have been controlled by DDT. Moreover, it is believed to be potentially effective against more than a dozen other diseases which are important in many parts of the world.

The most spectacular success of course, has been achieved in malaria prevention, through the application of residual deposits of DDT to the interior surfaces of dwellings. Be-

\*Delivered before the 21st Annual Meeting of the National Agricultural Chemicals Association, Spring Lake, N. J., September 8, 1954.

*By David E. Price*

Public Health Service  
U. S. Dept. of Health  
Education & Welfare  
Washington, D. C.

cause most mosquitoes rest on nearby surfaces after feeding, those that have acquired infections are eliminated as a result of this procedure.

Malaria control operations use most of the insecticides which are exported from the U. S. for public health purposes. The World Health Organization and the United States Foreign Operations Administration are the two principal organizations engaged in international malaria control activities. About 124 million people were protected against malaria during 1953 through assistance from the Foreign Operations Administration alone. Foreign Operations Administration aided malaria control operations are under way in 17 countries of the world at present. For this work, the FOA purchased about 22 million pounds of DDT 75% water-dispersible powder during the last fiscal year.

The largest single program is being conducted in India. Last year almost 14 and a half million pounds of DDT 75% wettable powder was shipped to India, at a gross cost of almost 4 and three-quarter million dollars. This DDT will be used to protect 125 million people against malaria. Last year alone the homes of 70 million Indian people were sprayed with this compound. The program in India is the largest malaria control operation with insecticides ever undertaken in the history of the world.

Most experts agree that malaria control represents the most effective kind of public health program now being conducted abroad. Malaria

control meets the five major criteria for a successful foreign aid program: (1) It is administratively and technically feasible; (2) its results are recognizable within a relatively short span of time; (3) its costs are commensurate with the expected and attainable benefits; (4) it is within the technical ability of the host country; (5) it affects a sizable number of people.

The experience in Venezuela illustrates dramatically the successful use of DDT in malaria control. In that country the average death rate from malaria was 112 per 100,000 population in 1941. Within 7 years the rate was reduced to 15 per 100,000 through an intensive program of DDT residual spraying of houses. Since 1948 the rate has gone down even further. Through the use of DDT and other residual insecticides, malaria has practically disappeared from Greece, Italy, British Guiana, and several other countries. In the United States an intensive five-year program of malaria eradication, begun in 1947, was largely responsible, although other factors were undoubtedly involved for the virtual elimination of this disease.

Throughout the world, insecticides have contributed much to the success of attacks against other diseases. The 1943 typhus epidemic in Naples was under control within two months after the start of control measures. Other louse-borne and flea-borne diseases have been suppressed in a similar manner. The decline in rodent-borne typhus fever in the United States resulted largely from the control of vector fleas on rats.

Insecticides helped control yellow fever in Brazil by eradicating the mosquitoes which transmitted the disease. Epidemics of dengue fever were successfully combatted with insecticides in Hawaii in 1943-44, in Madagascar in 1947, and in Saipan in August 1944. Local outbreaks of other vector-borne diseases, such as sandfly fever, filariasis, Japanese B encephalitis, and bartonellosis, have been controlled effectively with insecticides.

By using insecticides to destroy

flies, Public Health Service investigators have observed, it is possible to reduce enteric infections, a principal cause of infant deaths. Our scientists have found a significant reduction in the amounts of diarrheal infection, disease, and death as a result of fly control measures. Similar results were observed as by-products of programs to combat malaria in Greece and sandflies in Malta, both of which also controlled houseflies.

The accomplishments of the new pesticides have been spectacular indeed. However, several important problems have appeared in connection with their use. Among these are: (1) the development of satisfactory insecticide formulations for use in tropical countries; (2) the acquisition of resistance by many species of insects; and (3) the potential toxic hazard to humans from the use of some of the new compounds.

The Savannah laboratories of the Public Health Service's Communicable Disease Center are helping on the preparation of a satisfactory DDT specification. They are also testing other insecticides which may be used against *Anopheles* mosquitoes—the carriers of malaria—which become resistant to chlorinated hydrocarbon compounds.

#### The Problem of Insect Resistance

INSECT resistance was recognized as far back as 1897 when it was noted that certain species in the Atlantic Coast States succumbed readily to kerosene while the same species in Colorado remained unaffected. In 1944 and 1945 when DDT was used extensively by civilian and military authorities in Italy to combat malaria-carrying mosquitoes, within a year the first DDT-resistant house flies and mosquitoes were observed. In 1947, DDT was supplemented with chlordane, and both flies and mosquitoes were kept under effective control for a three-year period. In August 1950, however, chlordane resistance was observed in flies, and by the end of the year all of the house flies and one species of mosquito appeared to be resistant. The house flies were also resistant to dieldrin and methoxy-chlor. By the end of the following

year flies in every DDT-treated region throughout Italy were resistant to DDT, methoxychlor, chlordane, dieldrin, benzene hexachloride, and about every other available residual spray. Such resistance occurs typically in areas where residual spraying is employed in vector control programs. Reports of DDT resistance in house flies have now come from most countries of the world, with the exception of Japan and Korea.

Other insects of medical importance have also acquired resistance: body lice, bedbugs, and oriental rat fleas. Some species of mosquitoes developed resistance to chlorinated hydrocarbon compounds soon after application. In the United States in 1951, for example, *Culex tarsalis*, the most important known carrier of one type of sleeping sickness, was found to be highly resistant to DDT, as well as to toxaphene, lindane, aldrin, and heptachlor when used as larvicides. Anopheline mosquitoes have developed resistance more slowly than other mosquito species and house flies. Although eight species of malaria vectors have reportedly acquired some resistance, this has not been sufficient in most cases to interfere seriously with control activities. Serious resistance to DDT has been acquired by a species of malaria-carrying mosquito in Greece and by another in Indonesia.

Our weapons in the fight against vector-borne diseases are continually depleted by the ever-increasing resistance of insects to available pesticides. Intensive efforts are being made to meet this problem. New compounds are being developed and, for a while, serve as adequate replacements. Insects quickly become resistant to these compounds, however, especially those similar in structure and mode of action to chemicals now in use. Compounds with a different structure and mode of action usually give better results; for example, organic phosphorus insecticides have been used with success against insects which had become resistant to the chlorinated hydrocarbons. Attempts are being made to develop synergists which may be added to

**Record of newer pesticidal chemicals called generally good. Properly used, says this authority, insecticides do not cause disease, nor increased susceptibility to disease in man or animals.**

DDT formulations to enhance their lethal effect and overcome resistance.

The nature of resistance developed by various species of insects is also under study. Although slow and tedious, this approach should ultimately give us the information with which to overcome the acquired immunity of insects to pesticides. Thus far, research on insect resistance has been unable to keep pace with the expanding problem.

#### Toxicity to Humans Studied

THE problem of toxicity to humans is equally large and complex. Research on this subject requires the combined efforts of pharmacologists, physiologists, biochemists, pathologists, and other specialists. Studies are made to learn the effects of pesticidal compounds on experimental animals. By administering the materials through various routes, both the immediate and cumulative effect can be determined. Measurements are made of toxic residues, concentrations of poisons in air, and of compounds stored in tissues. To determine the effects of the compounds on human health, clinical studies are conducted on persons with histories of significant exposure to pesticides. Interest extends from those who manufacture the chemicals, to those who mix and apply them and centers eventually on the general population whose food or environment may be contaminated by the residues.

Although cases of acute poisoning have been reported for some of the newer pesticidal chemicals, their record is generally good. Objections to their use have ranged from the

serious to the unfounded or ridiculous. Insecticides, particularly DDT, have been alleged to be responsible for a variety of gastrointestinal complaints, a wide range of psychoneurotic disturbances, as well as for an increase in poliomyelitis, cancer, and other diseases.

The vast majority of physicians and other scientists who have studied the problem, do not accept these claims. The consensus is that, properly used, insecticides do not cause any disease or increased susceptibility to disease in either man or animals. This opinion is based on the results of extensive research.

Let me cite by the way of example a few studies conducted by Public Health Service investigators. A comprehensive study was carried out in the Mississippi Delta to determine whether the widespread use of insecticides had any adverse effects on the health of people living in that area. In one small city insecticides have been accused of being the cause or a contributing cause of fungus infections, hay fever, asthma, sinusitis, gastrointestinal upsets, cancer, poliomyelitis, heart diseases, and a host of other diseases.

In addition to clinical studies, reviews were made of school attendance records, State and area-wide mortality records, and morbidity records of a plantation hospital. Disease experience was compared for the periods before and after the introduction of the new agricultural chemicals. Similar comparisons were made between the regions along the Mississippi where insecticides were used sparingly and the Delta where agri-

cultural chemicals were used extensively in cotton culture.

In this study, our investigators found no evidence that pesticides were related to the occurrence of disease.

Let me turn now to some of the investigations on DDT, as illustrative of the studies on the toxicology of pesticides. DDT is a stable compound and a small amount remains on plants treated with the material. Since DDT is widely used on food and forage crops, all of us ingest small amounts of DDT in our diet.

A study to determine the magnitude and significance of this DDT intake was made recently at the Wenatchee, Washington, field station of our Communicable Disease Center. Representative meals in restaurants and institutions were analyzed for DDT. All were found to contain detectable but very small quantities of DDT and its metabolite, DDE. Calculations based on animal experimentation indicate that the average daily amount of DDT ingested with food is about one one-hundredth of the dose necessary to produce microscopic changes in the liver of rats. All results indicated that none of the meals analyzed contained enough DDT to be hazardous to man.

Animals that ingest DDT store the material in their tissues, especially in fatty tissues. A research team at our Savannah, Georgia, laboratory has analyzed the DDT stored in a large number of samples of human fat. Samples represented the general population as well as persons who had extensive exposure to DDT. The results show that some of the DDT is stored unchanged in the body fat and that as much or more is stored as a less toxic metabolite, DDE. The average amount of stored DDT is much less than comparable amounts which experimental animals can store without detectable injury. Workers who have extensive occupational exposure to DDT store far more of the compound, yet examination of a number of workers exposed for 5 years or more revealed no injury attributable to DDT.

One of the most promising re-

cent developments in determining DDT intoxication is the demonstration that exposure of human beings to significant dosage levels of DDT can be quantitatively related to the excretion of DDA in the urine. Formerly, the measurement of DDA in the urine has been accomplished or considered only in connection with single doses which were at or extremely near the toxic level. It has been a great drawback in the past that the only objective measure of human exposure to DDT was storage of the material and its derivative, DDE, in the fat. Persons who had extensive occupational exposure were frequently and understandably unwilling to submit to biopsy because they were healthy. It should now be possible to measure objectively and without inconvenience.

The work was done by investigators at the Communicable Disease Center's Technical Development Laboratory in Savannah, Georgia.

The problem of possible cumulative toxic effect of materials used on food crops is not new. The cumulative properties of new compounds must be carefully evaluated. For example, organic phosphorus compounds recently introduced are systemic in their action, that is, the material sprayed on one portion of a plant is translocated to other parts of that plant, including the fruit. Organic phosphorus compounds have generally been considered quite unstable and therefore devoid of a residue problem. Recent experiments have shown, with certain systemics at least, that this is untrue; fruit sprayed with heavy dosages of these compounds may remain toxic to experimental animals for many months.

#### **Tighter Insecticide Specifications Needed**

**P**ROGRESS in creating new chemical agents readily exceeds progress in the laborious toxicological testing necessary to their safe application. This important work needs to be expanded.

The problem of satisfactory formulation for use under conditions pertaining in many underdeveloped areas of the world was mentioned

above. Difficulties have been encountered with some insecticides, particularly DDT wettable powders, which become defective after arrival overseas. Each such episode is prejudicial to the health objectives of our foreign aid program as well as to the reputation of American industry. Of equal significance is the propaganda capital which can be made from the failure of inferior products.

Much of the difficulty experienced has been due to inadequate specifications provided to the manufacturer by government purchasing agencies, although in a few instances, materials of inferior quality were supplied. The Public Health Service is cooperating with the U. S. Department of Agriculture, the Foreign Operations Administration, and a committee of your own organization to improve and standardize the specifications for insecticides. We expect this cooperative relationship to be fruitful and pledge our best efforts toward its continuation.

Industry has growing responsibilities in the field of toxicology. The governmental agencies involved in the approval of labelling of pesticides are keenly aware of industry's efforts and expense in the search for and development of new compounds. We in government appreciate the inconveniences that sometimes result from restraints imposed upon the marketing of new compounds. However, reasonable doubts about the safety of pesticides must be resolved before the products are offered to the public. Premature approval could result in serious damage not only to the public health, but also to the reputation and profits of the industry.

In this connection, I should like to mention the new amendment to the Federal Food, Drug, and Cosmetic Act, toward which NACA has contributed so much time and energy. This amendment is of course designed to protect the public by establishing machinery for the setting of safe tolerance limits for pesticides. I would just like to note here that it will necessitate adequate study and testing of the new chemicals from the stand-

(Turn to Page 117)



**A**N atmosphere of guarded optimism and an intent interest in how to operate under the newly passed Miller Bill were obvious at the 21st Annual Meeting of the National Agricultural Chemicals Association last month. Modest success this summer, coupled with interest in the vital new legislation were credited with bringing out a record number of members to the meeting at Spring Lake, N. J., Sept. 8-10.

Attendance was at a new high, according to program chairman Richard T. Yates, of Hercules Powder Co., Wilmington, topping even that of the 1953 meeting, which marked the 20th anniversary of the organization.

The association climaxed the three-day meeting with election of W. W. Allen, to succeed Paul Mayfield as president of NAC. Mr. Allen is manager of agricultural chemical sales for Dow Chemical Co., Midland, Mich. Mr. Mayfield, who is general manager of the Naval Stores Department of Hercules Powder Co., Wilmington, Del., stepped down from the presidency after serving one year instead of the customary two because of the pressure of other responsibilities connected with his new work at Hercules Powder Co.

Fred W. Hatch, vice president of the Agricultural Chemicals Division of Shell Chemical Corp., Denver, Col., was named vice president. Lea S. Hitchner, who has served with the organization since its inception, was elected to another term as executive secretary-treasurer.

The group also set next year's spring meeting for the Chase and Park Plaza Hotel in St. Louis for March 7-9, 1955. Three new di-

rectors were elected to the board of NAC, replacing three whose terms expired.

Elected to 5-year terms were: Chester M. Brown, executive vice president, General Chemical Division, Allied Chemical and Dye Corp., New York; Charles H. Sommer, Jr., vice president, Organic Chemical Division, Monsanto Chemical Co., St. Louis; and J. V. Vernon, president, Niagara Chemical Division, Food Machinery and Chemical Corp., Middleport, New York.

The Miller Amendment naturally came in for a lot of attention on the program, with a panel discussion outlining what the new legislation means to members of the pesticide industry. The annual report of the association, delivered by Mr. Hitchner, also was of unusual interest. Other general topics covered by speakers included antibiotics in agriculture, and the position of American Youth and the American Farmer as industry customers. These topics are covered in the following sections.

Another talk, by Dr. David E. Price, assistant surgeon general of the U. S. Public Health Service, is reprinted elsewhere in this issue. The crux of Dr. Price's remarks was that there is no evidence that insecticides cause any diseases or increased susceptibility to disease in either man or animals (see story page 34-37).

#### Secretary's Report

**M**OST important developments in NAC during the past year were passage by Congress and the

signing by the President of the Miller Bill and the inauguration of the herbicide promotion program. That was the statement of Mr. Hitchner, in his annual report as executive secretary of the group.

He said work connected with the Miller Bill had taken up a vast amount of NAC staff time during the past two years. He added "it is believed by all interested parties that the present legislation will set a pattern for correcting many problems which have existed for a long period of time."

Mr. Hitchner did not read the complete annual report of the association, which was offered in booklet form. Rather he referred to it briefly, then went on to outline some of the projects in progress or under consideration by the board of directors, various committees and the staff.

For his part, President Mayfield discussed the value of membership in NAC as an "investment in progress," and went on to declare that the products of the pesticide industry protect the nation's agriculture and have a direct effect on health.

Mr. Hitchner opened his remarks by declaring that the "vigorous program conducted during the last two years involving product liability is paying off."

"This opinion is based on the reduced number of claims being reported and a general recognition of the program by most of our members," he added. "However, we are preparing to bring these reports up

## NAC Conference

**Facing page board members of the NAC, standing, left to right:**

John H. Kennedy, Stauffer Chemical Co., N. Y.; Chester M. Brown, Allied Chemical & Dye, N. Y.; August Petrus, Cotton States Chemical Co., West Monroe, La.; James McConnon, retiring, McConnon and Co., Winona, Minn.; T. L. Wilkerson, American Cyanamid Co., N. Y. C.; L. S. Hitchner, NAC Association, Wash. D. C.; Fred Shanahan, Pennsylvania Salt Mfg. Co. of Washington, Tacoma, Wash.; Jack V. Vernon, Niagara Chemical Div., Food Machinery & Chemical Corp., Middleport, N. Y.; Russell B. Stoddard, Fairfield Chemical Division, N. Y. C.; G. C. Romig, American Chemical Paint Co., Ambler, Pa.; George F. Leonard, retired, Richmond; E. H. Phillips, G. L. F. Soil Building Service, N. Y. C.

**Seated, left to right:** A. W. Mohr, California Spray Chemical Corp.; F. W. Hatch, Shell Chemical Corp., Denver; W. W. Allen, Dow Chemical Co., Midland, Mich.; Paul Mayfield, Hercules Powder Co., Wilmington; B. P. Webster, retiring, Chipman Chemical Co., Bound Brook, N. J.; D. F. Murphy, Rohm & Haas, Philadelphia; J. M. Taylor, retiring, Taylor Chemical Co., Aberdeen, N. C.

## Features Miller Bill

**Top left photo:** J. Miller, Atlas Powder Co., Wilmington, Del.; J. Brunton, Kolker Chemical, Kearny, N. J.; B. P. Webster, Chipman Chemical Co., Bound Brook, N. J.; L. K. Brunn, Atlas Powder Co., Wilmington, Del.; G. Fleming, Natural Products Corp., Montreal, Canada; **seated:** D. C. Van Winkle, Atlas Powder Co., Wilmington, Del.; G. R. Ferguson, Geigy Chemicals Corp., New York.

**Bottom left photo:** D. J. Murphy, Monsanto Chemical Co., St. Louis; C. P. Zorsch, Monsanto Chemical Co., St. Louis; M. C. Morton, Central Chemical Co., Hagerstown, Md.; **seated:** R. W. Yoder, American Cyanamid Co., New York; and D. L. Kent, Goodrich Chemical Co., Cleveland.

**Top right photo:** B. Renne, Virginia Carolina Chemical Corp., Richmond, Va.; J. Long, Virginia Carolina Chemical Corp., Lancaster, Pa.; R. Stoddard, Fairfield Chemical Div., N. Y.; C. Martin and R. West, both of Attapulugus Division, Philadelphia.

**Bottom right photo:** H. Douglas Tate, Naugatuck Chemical Div., U. S. Rubber Co., Naugatuck, Conn.; P. S. Cartier, Eastern States Farmers' Exchange, Inc., W. Springfield, Mass.; T. W. Brasfield, Naugatuck Chemical Co.; **front row:** M. J. Bunnell, and C. C. Alexander, both of Geigy Agricultural Chemicals Co.; and W. H. Prigmore, Eastern States Farmers Exchange, W. Springfield, Mass.

to date so as to have a complete record of what has happened to all of the cases previously reported, and a complete up-to-date statistical picture."

Mr. Hitchner also mentioned these other projects:

1. A world survey of insecticide markets, under study by the department of Commerce. He said NAC hopes to be able to distribute results of the survey to its members.

2. A study of inventory stocks by the Department of Agriculture in cooperation with industry members. The executive secretary called for industry cooperation in this survey.

3. Appointment of a permanent medical committee by NAC, under consideration by the board, to give advice and make recommendations on matters relating to public health, hazards of use and similar medical problems.

4. A program, ready for approval, for distribution of data prepared by the U. S. Public Health Service on clinical memoranda for physicians' use in diagnosis and treatment of pesticide poisoning.





5. Procedures used for purchase of pesticides by the government for distribution in the world public health and agricultural programs are being discussed with the government by a subcommittee of the Technical Committee of NAC.

6. NAC again is sponsoring use of the Inter-Association Council's publicity and poster program. A display in the lobby of the Essex and Sussex, convention headquarters, showed the posters.

The outgoing president, Paul Mayfield, declared that, while total industry sales of 300 million dollars a year are small compared to the

**All photos read from left to right.**

**Top left photo:** J. C. Walker, Frontier Chemical Co., Wichita, Kans.; R. W. Breidenbach, Commercial Solvents Corp., New York; and M. E. Clark, Frontier Chemical Co., Wichita.

**Top right photo:** Lea S. Hitchner, executive secretary, NAC; Paul Mayfield, retiring NAC president; and William Allen, newly elected NAC president.

**2nd from top, left photo:** F. J. Woods, General Chemical Div., Allied Chemical & Dye Corp., New York; J. L. Damon, General Chemical Div. and P. O. Peterson, Stauff & Chemical Co., Apopka, Fla.

**2nd from top, right photo:** Richard Yates, Hercules Powder Co., Wilmington, Del.; Mrs. R. Zipse; Robert Zipse, John Powell & Co., Div. of Mathieson Chemical Corp.,

**3rd from top, left photo:** Dr. C. O. Eddy, Niagara Chem. Div., Food Machinery & Chemical Corp., Middleport, N. Y.; J. V. Vernon, Niagara Chem. Div., Middleport, N. Y.; Alfred Weed, John Powell & Co., Div. of Mathieson Chemical Corp.

**3rd from top, right photo:** A. J. Rauler, Michigan Chem. Corp., St. Louis, Mich.; C. F. Gerlach, Wyandotte Chem. Corp.

**4th from top, left photo:** J. A. Rodda, Fairfield Chem. Div., Food Machinery & Chemical Corp., New York; J. H. Hoesfler, B. J. Pratt Co., Roselle, N. J.; J. Watson, J. M. Huber Corp., New York

**4th from top, right photo:** W. J. Haude, Grace Chemical Co., New York; C. C. Compton, Shell Chem. Corp., Denver, Colo.; V. Rebak, Grace, and Mort D. Leonard, Shell Chem. Corp., N. Y.

**5th from top, left photo:** Pat Henry, Wilson Products; and E. D. Witman, Columbia Southern Chemical Co.

**5th from top, right photo:** L. Gopp, International Minerals & Chem. Corp., Chicago, Ill.; Jack W. Moore, Floridin Co., Tallahassee; W. R. Andrews, W. R. Andrews Sales Co., Phila., Mrs. Andrews.

**Bottom left photo:** P. D. Peterson, Stauffer Chemical Co., Apopka, Fla.; Joe Noone, NAC Association, Washington, D. C.; L. G. Utter, Diamond Alkali Organic Chemicals Div., Newark, N. J.; F. L. Holland, Florida Agric. Res. Inst.

**Bottom right photo:** R. W. Roth, Velsicol Corp., Chicago; D. Malcolm, John Powell & Co., Div. of Mathieson; S. Epstein, Emulsol Corp., Chicago.

entire American economy, "yet the products we make and sell protect the economy of our national agriculture and have a direct effect upon public health, including the processing and packaging of food. Your responsibility to the people of the country and the stake you have in this business is far out of proportion to your dollar sales," he asserted.

Mr. Mayfield gave scientific support to his statements by a novel use of a tape recording of a talk by Dr. Byron T. Shaw, administrator of USDA's Agricultural Research Service.

Dr. Shaw said opportunities for pesticides are tied in with research and called for the following five new types of chemicals: chemicals to control destructive pests which infest the soil; new materials and techniques for control of range and grassland insects; new herbicides that hit the weed target like a rifle; a chemical for cotton growers that will hold back regrowth after defoliation or dessication; and more combinations of pest control materials.

On the question of acreage allotments, Dr. Shaw had this to say: "It is difficult to analyze the situation in terms of pest control requirements. However, we expect to see continued use of larger quantities of these chemicals. The farmer who derives his income from fewer acres will usually attempt to get maximum yields from the restricted plantings. He will use more fertilizer and give closer attention to controlling losses from pests. And the applications of chemicals per acre are likely to be higher than before."

#### Miller Amendment

**A** COMPLETE resume of the new Amendment — what it is, why it was written, how it will work — was presented in the panel occupying the second session of the NAC meeting.

Two government officials complemented the remarks of NAC's technical and legal advisers in airing the provisions of the legislation. Mr. Hitchner was chairman of the panel, commenting on the amendment and introducing these panel members:

**All photos left to right.**

**Top photo:** G. F. Hogg, Hercules Powder Co., Wilmington, Del.; P. J. Reno, Hercules Powder Co., Wilmington, Del.; Carlos Kampmeir, Rohm & Haas Co., Philadelphia.

**Second from top:** M. D. Reichard, Stauffer Chemical Co., New York; G. W. Hill, Chemagro Corp., New York; A. E. Albright, Stauffer Chemical Co.

**Third from top:** Leon Kaniecki, Tennessee Corp., Atlanta, Ga.; Mrs. Murray, and J. E. Murray, Tennessee Corp., Atlanta.

**Fourth from top:** A. F. Bixby, Pennsalt Mfg. Co. of Wash., Tacoma, Wash.; Mercer Rowe, Ashkraft Wilkinson Co., and A. Connelley, General Chemical Div., Allied Chemical & Dye Corp.

**Fifth from top:** Jack Polite, Diamond Alkali Co., Cleveland, O.; Bruce Gleissner, Diamond Alkali Co., Cleveland, O.; A. C. Hobbie, Corona Chem. Div., Pitts. Plate Glass, W. Moorestown, N. J.

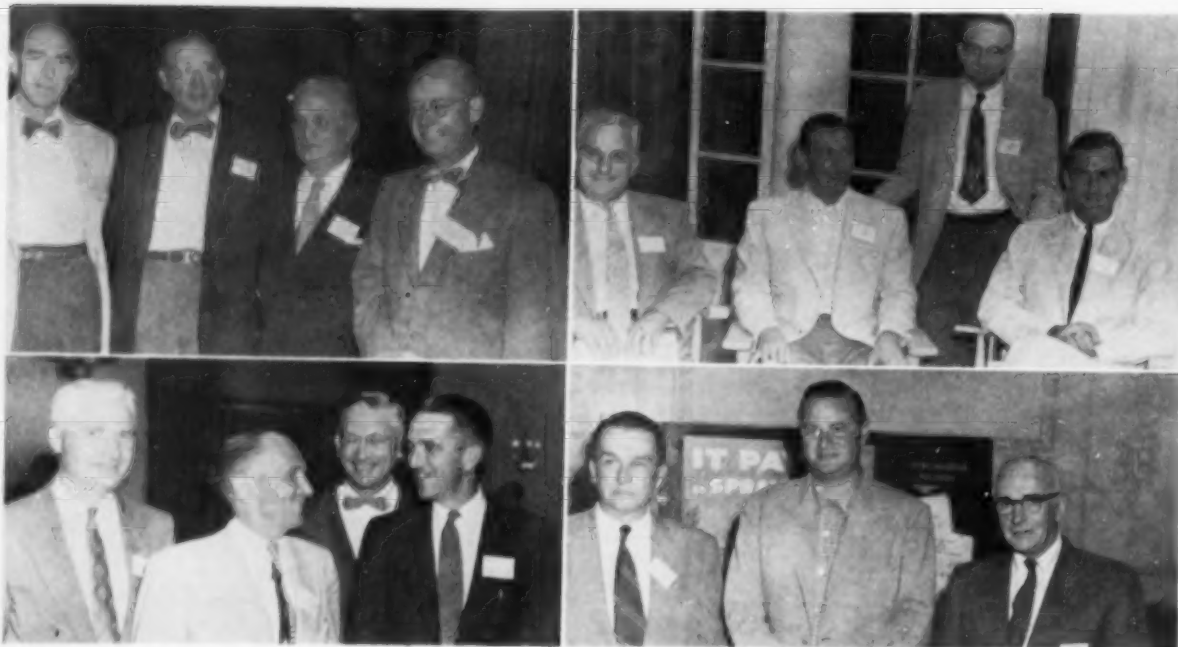
**Bottom photo:** H. Guardia, Quimagra, Ltd., San Jose, Costa Rica; S. Marshall, Central Chemical Corp., Hagerstown, Md.; J. P. McKenna, Quimagra Agricolas Centro Americas, San Jose, Costa Rica.

William W. Goodrich, assistant general counsel, Food & Drug Division, Department of Health, Education & Welfare, Washington, D. C.; John T. Coyne, assistant head, Pesticide Regulation Section, Plant Pest Control Branch, Agricultural Research Service, U.S.D.A.; John D. Conner, NAC counsel; and Joseph A. Noone, NAC technical adviser. A resume of their comments follows:

**Hitchner:** Outlined the history of pesticide legislation, starting with the original Insecticide Act of 1910. He said the problem of residues is not a new one, but has troubled industry and government for many years.

"Because of the failure of previous legislation and because of increased interest created by development of the many organic pesticides, the present legislation was introduced in Congress and passed." He said passage of the law in itself solves nothing. "The value of any legislation depends upon intelligent administration and the cooperation of those regulating it . . . The present legislation, however, with the unanimous support and cooperation of all interested groups, and particularly the Department of Health, Education and Welfare, — we believe has an excellent chance of becoming an effective





All photos read from left to right.

**Top left photo:** Frier Thompson, Athens, Ga.; S. Besthoff, Faess & Besthoff, Inc., New York; H. Noble, S. B. Penick & Co., New York; Robert Peacock, General Reduction Co., Chicago, Ill.

**Bottom left photo:** L. R. Gardner, Calif. Spray Chem. Co., Richmond, Calif.; H. J. Grady, Calif. Spray Chem. Co., Washington, D. C.; E. W. Cannon, Calif. Spray Chem. Co., Richmond, Calif.; T. W. Reed, Calif. Spray Chem. Co., Haddonfield, New Jersey.

**Top right photo:** J. E. Bussart, Velsicol Corp., Chicago, Ill.; W. J. Gehweiler, R. T. Vanderbilt Co., New York; W. K. Feustel, R. T. Vanderbilt Co., New York; G. W. Ahl, Jr., Summit Mining Corp., Carlisle, Pa.

**Bottom right photo:** G. Krieger, Ethyl Corp., New York; Bob Zipse, John Powell & Co., Div. of Mathieson Chem. Corp., New York; J. A. Costello, Ethyl Corp., New York.

instrument in protecting the public health and making possible the production and safe use of pesticides."

He quoted George P. Larrick, new commissioner of food and drugs, as saying "The NAC and the pesticide industry made an important contribution to the public welfare through their interest in the amendment."

Conner: Praised the NAC executive secretary, stating, "I think that the seed out of which the Miller Bill germinated was first planted by Lea Hitchner," and went on to summarize the amendment as follows:

What does this bill do? First, in substance it says that after the effective date any food will be deemed to be adulterated if it contains the residue of a pesticide which is not generally considered to be safe unless (1) the amount of the residue is within the limits of a tolerance which has been established by regulation or (2) the residue has been specifically exempted from the necessity of a tolerance by regulation. There are,

therefore, two types of regulatory action which can be taken with regard to a specific pesticide. First, it may be exempted from the necessity of a tolerance and second, a specific tolerance or tolerances can be established. The tolerance may vary from zero up to any appropriate limit.

Through what procedure can this regulatory action be taken? First, the bill permits any person who has registered a pesticide or who has applied for registration to initiate the proceeding to establish a tolerance or to obtain an exemption relating to one of its constituent pesticidal chemicals. This represents a substantial improvement over the provisions of existing law. Under the old procedure, a proceeding to establish a tolerance could be instituted only by the Government. This made it difficult, if not impossible, for any company interested in establishing a tolerance to instigate action to obtain a tolerance for that product.

Secondly, the new legislation substitutes an informal type of pro-

cedure based upon a prompt time schedule for the old formal proceeding with its indefinite and protracted time schedule. Yet, if this free interchange of technical data and informal negotiation fails to produce an accord, any interested party is given the right of a full hearing and judicial review.

To what products does the pesticide residue amendment apply? It was only after protracted consideration by all of the interested groups that the decision was made to limit this legislation to pesticidal residues remaining on raw agricultural commodities. The legislative history of this legislation spells out in considerable detail what is considered to be embraced within the term "raw agricultural commodity." Pesticidal residues on processed foods will remain subject to the provisions of existing law.

When does this new law become effective? The procedural provisions of the new law became effective immediately upon its enactment on July 22, although it is not anticipated that

the procedure for establishing new tolerances will be utilized until after the Secretary of Health, Education and Welfare has issued regulations spelling out in more detail the procedure to be followed. The adulteration provisions of the new law do not become effective until July 22, 1955, except in the case of products for which tolerances are issued before that date. The date can be extended until July 2, 1956, at the discretion of the Secretary of Health, Education and Welfare. This means, for all practical purposes, that both the Government and the companies will have a minimum period of one year and a maximum period of two years to prepare for compliance with the act, except, of course, for those products for which tolerances are issued sooner.

He concluded with the statement that industry members must de-

cide promptly "how your products will fit into this pattern. Do they fall into the group for which proposed tolerance on fruits and vegetables may shortly be issued? Should you take the initiative in petitioning to have tolerances, or additional tolerances established? If so, when should this be done? Should it be done individually or in cooperation with other companies?"

Noone: Said one of the principal provisions of the amendment is to simplify the procedure for setting tolerances. "The old procedure occupied only five paragraphs of the Food, Drug and Cosmetic Act. The bill to simplify the procedure is 19 pages long. Despite the increased verbiage, the tolerance setting process has been improved, simplified and made more flexible."

He traced the steps involved in petitioning the Food and Drug Ad-

ministration for establishment of a tolerance, distinguishing between new chemicals and situations where pesticide chemical involved is one which has been on the market sometime.

"We understand the Food and Drug Administration will issue in the near future proposed tolerances for most pesticides now in use. However, we also understand that final decision has not been made as to which of the alternative procedures will be adopted."

He referred to issuance on the basis of the lengthy 1950 hearings or under terms of the Miller amendment.

The technical adviser admitted that the new legislation "is lengthy and may appear complicated" because it provides various procedures to take care of many eventualities. But he said that basically it provides a simple, direct, tolerance-setting mechan-

**All photos read from left to right.**

**Top left photo:** W. F. Hall, Chapman Chemical Co., Bound Brook, N. J.; G. Simches, Planters Chemical Corp., Norfolk, Va.; A. Petrus, Cotton States Chemical Corp., West Monroe, La.; J. Maddrey, Planters Chemical Corp., Norfolk, Va.

**Bottom left photo:** A. M. Gladstone, Nopco Chemical Co., Harrison, N. J.; J. F. Hanley, Coop. Seed & Farm Supply Serv., Richmond, Va.; J. H. Kennedy, Stauffer Chemical Co., New York; L. D. Grupelli, Nopco Chemical Co., Harrison, N. J.

**Top right photo:** NAC Staff at Registration des; **Standing (left to right)** Val Weyl and W. Moreland. Seated are staff members of the National Agricultural Chemicals Association.

**Bottom right photo:** J. A. Singmaster, Jr., Monsanto Chemical Co., New York; N. M. Walker, Pennsalt Mfg. Co., Philadelphia, Pa.; H. W. Hamilton, (seated) Chemical Specialties Mfrs. Assoc., New York; John D. Conner, NAC Association, Washington, D. C.; E. Greene, Monsanto Chemical Co., New York.



ism which will take care of most requests for tolerances. "We are sure you will find it much more satisfactory than the old law," he concluded.

**Goodrich:** Described the two fundamental changes for establishment of tolerances:

1. It quite properly assigns agricultural functions to the Secretary of Agriculture and health functions to the Secretary of Health, Education and Welfare.

2. Emphasizes informal procedures, newly designed to facilitate action and to grant a more dominant role to the scientists.

He explained that the first thing to be done in implementing the new legislation is the promulgation of basic operating regulations, which, he pointed out, will be concerned with the following things:

1. Interpretations explaining what is regarded as a "raw agricultural commodity;" and what the relationship of the established tolerance is to foods produced from raw agricultural commodities; how to find out whether we regard a particular pesticide chemical as unsafe and a tolerance necessary; how tolerances will be fixed for related poisonous and deleterious pesticide chemicals; and what the bases are for fixing the tolerance at zero.

2. Procedure for filing petitions.

3. Procedure for the appointment and functioning of ad hoc advisory committees.

4. Procedure in event formal hearing is necessary.

5. Procedure for establishing temporary tolerances and for amending or repealing tolerances.

6. Fees to be charged for various services. (He added that they will be fixed "as low as possible to cover costs alone.")

**Coyne:** Said the Plant Pest Control Branch, has been designated by the Secretary of Agriculture to administer part of the Miller Amendment. The Branch will have two basic responsibilities: to certify to the secretary of HEW as to usefulness of a pesticide for the purpose for which a tolerance or exemption is sought; and it shall submit with any certification of usefulness an opinion based

on the data before it, whether the tolerance or exemption proposed by the petitioner reasonably reflects the amount of residue likely to result when the pesticide chemical is used in the manner proposed for the purpose for which certification is made.

Coyne also contributed this valuable definition of the term "useful": "We feel that the usefulness of a pesticide chemical should be determined on the basis of its practical biological or pesticidal effectiveness. Pesticidal effectiveness may be established in terms of percentage reduction or control of pests or, when appropriate, increase in yield or quality of crop following application of the specified pesticides under the conditions prescribed, compared with results from adequate controls. In determining practical effectiveness consideration may be given to other economic gain or practical benefit including economy or ease of production, harvest or storage of the crop, flexibility as regards time of planting or harvest, and general benefit to livestock, plants or human welfare.

Turning to the effect of tolerances on industry activities, he added "it is our belief that the announcement of tolerances for pesticide chemicals now registered under the Federal Pesticide Law will not result in drastic revisions of existing labeling.

Following the formal presentation of reports concerning the Miller Amendment, NAC members took the opportunity to question the panel on points which were not quite clear. In this discussion, the meaning of "O ppm tolerance" was brought up for question, and the panel pointed out that in some cases, minute traces of residue might be allowed; however, no minimum residue would be specified in the regulations since the tendency might then be to strive for the minimum set rather than the O ppm specified in the Amendment.

Another question centered on the responsibility of the user of pesticides approved under the Miller Amendment. The question was stated as follows: "If a tolerance is set, and following use of the insecticide a food crop is confiscated because of exces-

sive residue, where does the responsibility lie?" Panel member, W. W. Goodrich, stated that the responsibility in such a case would lie with the manufacturer, and that in such a case he would be cited for a false guarantee.

Still another question brought the following clarification from panel member John Coyne: where a tolerance for a particular material is set for one applicant petitioning for tolerance, and the pesticide is recognized as "useful," a second manufacturer wishing to use the identical product for the exact same purposes does not need to present new research data in filing a petition for tolerance, but can rely on the research of the first applicant.

#### Antibiotics

TWO government experts on antibiotics, William R. Jester and John C. Dunegan, reported on the rapidly expanding field for the modern "miracle drugs" in the control of some plant diseases.

**Mr. Jester,** assistant director in the Division of Antibiotics of the Food & Drug Administration, declared that "by far the most important recent use of antibiotics is for the control of certain plant diseases." He said research in the use of the drugs for agriculture reached its peak in 1953 and resulted in amendment of the antibiotic regulations of the Food and Drug law this year.

As amended he quoted the law as saying, in substance, that the antibiotics "intended solely for application to plants for the control of plant diseases" are not subject to the requirements of the drug section of the law if the antibiotic product contains one or more suitable denaturants that make it unfit for drug use.

**Mr. Dunegan** talked about the use of antibiotics in diseases of apples and pears and certain vegetables. He reported that antibiotic materials offer possibilities of plant disease control not dreamed of 10 years ago.

#### Personnel Training, Publicity

IN two other talks, the importance of publicity and the value of a personnel training program were ex-

(Continued on Page 107)



**Speakers at Fertilizer Round Table Meeting (l. to r.):** G. Halldorsson, E. Renneburg & Sons, Baltimore; W. E. Schaffnit, Stedman Foundry & Machine Co., Philadelphia; W. Sackett, A. J. Sackett Co., Baltimore; W. F. Jacobi, Union Bag & Paper Corp., New York; J. Wilhelm, Patterson Foundry & Machine Co., Baltimore; W. J. Sefle, Link Belt Co., Chicago; J. Renneburg, E. Renneburg & Sons, Baltimore; W. L. Inglett, Inglett & Corley, Inc., Augusta, Ga.; V. Sauchelli, Davison Chemical Co., Baltimore; W. King, W. S. Tyler Co., Cleveland; and E. J. Leister, E. Renneburg & Sons, Baltimore.

## *Fertilizer Round Table discusses granulation*

**A**UTOMATIC and batch process equipment used in a modern fertilizer plant were described and discussed by representatives of leading equipment manufacturers at the second annual meeting of the Fertilizer Industry Round Table, held September 14-15 at the Hotel Martinique, New York City. Vincent Sauchelli, Davison Chemical Co., Baltimore, who has organized the two meetings and arranged the programs acted as chairman of the two-day session.

Dr. Sauchelli pointed out that the meeting is directed to plant operators, foremen, superintendents, etc. . . . the personnel actually involved in manufacturing fertilizers. Questions on problems and operations of interest to manufacturer of fertilizers are discussed at the meetings of the Fertilizer Industry Round Table, which this year considered plant equipment, with particular reference to granulation and ammoniation. Those participating in the discussion included representatives from: The A. J. Sackett Co., Baltimore; Stedman Foundry & Machine Co., Philadelphia; W. S. Tyler Co., Cleveland; Inglett & Corley Co., Augusta, Ga.; Link Belt Co., Chicago; E. Renneburg & Sons Co., Baltimore; Union Bag & Paper Co., New York; Patterson Foundry & Machine Co., Baltimore; and Posey Iron Works, New York.

Dr. Sauchelli announced that the 1955 meeting would continue the discussion of fertilizer plant equipment and would be held in June, in Washington, D. C. Actual place and date will be announced later.

Walter J. Sackett, A. J. Sackett and Sons Co., Baltimore, Md., discussed in quite some detail the overall operation of a very modern fertilizer mixing plant, which the Sackett Company is constructing for The Farm Bureau Cooperative Association in Morrow County, Ohio.

Mr. Sackett described and illustrated with the aid of slides every production phase of the plant's operation including the receiving of raw materials, the preparation of raw materials prior to compounding and the proper proportioning and blending of solid materials prior to ammoniation.

He then explained the T.V.A. continuous ammoniating and granulating phases. This was followed by a description of the drying and cooling, the final product classifying and the shuttle belt system used for conveying to storage. He also included in his discussion descriptions covering the shipping of the product in both bulk and packaged forms. A note-

worthy feature of this new production facility is its ability to produce mixed fertilizers of both conventional and granular types.

### **Grinding Superphosphate**

**A** DISCUSSION of grinding operations led by W. E. Schaffnit of the Stedman Foundry & Machine Co., Philadelphia, centered on some of the problems involved in grinding triple super phosphate. Mr. Schaffnit indicated that a cage mill is perhaps the best type mill for grinding triple. He indicated also that best results are obtained if the fines are removed before grinding.

A hammermill is not recommended for grinding triple, according to Mr. Schaffnit, because of the soft center of this material and its sticky nature. It was brought out that the hammermill can be used on superphosphate if it is cured . . . otherwise the problem of plugging up the mill is encountered.

A further comparison of the cage mill and the hammermill brought out that the hammermill handles about 20-22 per cent of its own tailings, while a cage mill can handle as much as 40-50 per cent. It was also sug-

(Continued on Page 111)

**I**N 1947 experimenters in the Agricultural Chemical Laboratory of the Naugatuck Chemical Division, United States Rubber Company synthesized maleic hydrazide (MH) as a potential fungicide in view of its structural similarity to the commercial quinone fungicides, Spergon and Phygon. The new chemical, evaluated in a broad agricultural chemical screening schedule, showed only mild fungicidal properties, but did produce a striking inhibition of plant growth. This unique effect was reported in 1949. (24)

Since the first announcement of MH, more than 650 investigators have experimented with the chemical and reported on their findings in over 300 publications. This is a summary of the major work done with MH, and a report on its status in the agricultural chemical field today.

Extensive toxicological studies over the past three years indicate that MH is non-hazardous and non-irritating. For example, rats reared through three generations exclusively on a diet containing 5.0% MH as a sodium salt showed no deviation from normal. (20) Tests also have shown that MH does not inhibit the division of animal cells, one of the responses evident in plants treated with the compound. (10)

MH sprayed on a plant surface is absorbed and moves internally to block the growth-promoting hormone present in the plants. (15) Plant reaction varies both with the dosage applied and the plant's stage of development. The chemical often produces a varied response in the same plant. For example, spraying MH on young celery will promote flowering, but an MH spray at a later stage of growth will inhibit seed stalk development. (31) Spraying MH in the spring produces dwarf apple trees (28) but a pre-harvest treatment promotes the development of red color in apples (29) and reduces their softening rate in storage (25).

At the present time MH is being used commercially to inhibit the sprouting of stored onions and potatoes, prevent sucker growth on tobacco plants, retard the growth of grass and hedges, and as an herbicide



for the control of quack grass, wild onions, and wild garlic.

#### Onions and Potatoes

**L**OSS of onions and potatoes through sprouting in storage is a well known problem. One spray of two to three pounds of MH active per acre on the green tops of onions one or two weeks before harvest, or a similar amount on potato vines four to six weeks before harvest, is sufficient to retard sprouting. The chemical is translocated downward to the roots, and the presence of five parts per million of MH in the onion bulb or potato tuber prevents sprouting without adverse effect on color, flavor, or appearance. (32)

The time of application is rather critical in retarding the storage sprouting of onions with MH. If MH is sprayed too early on onions—before the bulb is mature—it will cause a hollow or “puffy” onion. However, this effect has been made an advantage where MH is used to control wild onions and wild garlic. (11) Sprayed in either spring or fall, when bulbs begin to show regrowth, MH will inhibit the growing point, producing a hollow bulb in wild onion or garlic. Rot organisms then subsequently destroy the hollow bulb of these weeds which are common in pastures, and give a “garlic taint” to milk if not eradicated.

Potatoes stored above 45°F. tend to sprout, and if stored below this temperature build up sugar which makes them undesirable for eating. (32) The presence of sugar also makes the potatoes undesirable for potato chips because the high sugar content causes excessive browning. (23) The small amount of MH present in the tuber after spraying will prevent sprouting even when the potato is stored at 55° to 65°F. (32)

MH has also been used, in pre-harvest sprays, to retard sprouting in storage of carrots, beets, turnips, parsnips, and rutabagas. (32)

#### Tobacco Suckering

**T**OPPING and suckering of flue-cured tobacco increases leaf yield by \$119.00 per acre when compared to non-topping. (1) Removal of the flower, however, forces the growth of suckers which are generally removed manually at an average expenditure of 32 man hours per acre. (30) One spray of 2.25 pounds of MH active per acre at the time the plants are topped inhibits sucker development without affecting adversely the quality or yield. (4, 21, 27)

This use for MH was extensively field-tested last season in the South's tobacco-growing sections. More than 100 individual tests were made with the cooperation of experiment stations

and growers. The majority of these were made in Georgia and North Carolina. This year many growers are using the chemical on part of their acreage to stop sucker growth, applying either with ground equipment or by air.

#### Grass Growth Control

**F**OR the past five years MH has been sprayed on grass areas along Connecticut highways in co-operative experiments conducted with the Connecticut Highway Department. These tests indicate that fre-

quency of mowing can be markedly reduced without adverse effect on the appearance or growth of the grass through the proper application of MH. In some cases, under the best conditions, the frequency of mowings during the growing season was reduced from 19 to 2.

A dosage of four pounds active per acre was generally effective. The optimum time of treatment was found to be either in early spring when grass was two to three inches tall or in the fall. The latter spray showed inhibition the following season. (35)

It has also been determined that an MH spray on an established lawn will inhibit growth and permit conversion of the lawn to Bermuda or Zoysia grass. (26) These grasses are started by inserting plugs of the new grass into the established lawn. The MH spray puts the established lawn into a period of temporary dormancy, allowing the new plugs to get a foothold in the lawn and overgrow the established lawn.

#### Quack Grass

**Q**UACK grass is considered to be one of the ten most noxious weeds in the United States. A cool-climate weed, it is found across the whole northern section of the United States. To eradicate it, it is treated with MH during the spring in approximately the same dosage used for grass growth control. The chemical is translocated in maximum quantities to the plant's rhizomes within four to eight days. If the quack grass is then plowed under during this interval, regrowth is prevented. (5, 34) Since MH neither contaminates the soil (16) nor affects the microfauna (19), crops can be planted in the treated area immediately after the quack grass has been plowed under.

#### Other Uses

**G**ROWTH of pyracantha (12) and privet hedge (22) was retarded through the application of (Continued on Page 113)

## MALEIC HYDRAZIDE

a plant growth inhibitor

By John W. Zuchel  
Houghton Chemical  
Division of United States Rubber Co.  
Bethany, Conn.

**Facing page:** Grass on right sprayed with maleic hydrazide. Note marked contrast with untreated check on left.

**Extreme right:** Table beets treated with a pre-harvest spray of maleic hydrazide. Right hand holds treated beet, left hand holds untreated beet. Note sprouting. Beets had been stored two months at time of photograph.

**At right:** Tobacco plant on left treated with maleic hydrazide. Plant on right hand-suckered twice, and now showing third crop of suckers. Photo by J. Gaines.



*novel N. J. approach may*

## HELP SELL CHEMICALS

**A** NOVEL approach to grassland farming, developed at Rutgers University, New Brunswick, N. J., may go a long way toward stimulating sales of fertilizers and herbicides. The program, still only in the tentative stage, was described last month to fertilizer manufacturers and dealers in New Jersey at the state university, Sept. 23. It was part of the annual New Jersey Fertilizer Conference, held this year in Lipman Hall, with 125 persons attending.

M. A. Sprague, associate research specialist in farm crops at the college farm, outlined the grasslands program and told of preliminary results in 15 tests conducted in the northern part of the state.

The grasslands movement started about 25 years ago in the upper Midwest, Mr. Sprague stated, and got its biggest push a few years ago when the USDA and industry members got behind the drive for more efficient growth of grass for foraging and for conservation. But the biggest roadblock to success of the program, he asserted, has been the resistance of farmers throughout the United States to carrying out all the procedures necessary for growing and maintaining good stands of grass.

The conventional method of grasslands farming, followed by an all-too-small number of farmers on a limited acreage throughout the country, has been a time-consuming job, involving a series of discings to remove old grass and prepare the land for reseedling. Mr. Sprague's approach cuts this time considerably, saving

time and money for farmers, first tests indicate.

It involves using lots of fertilizer, in conjunction with new and powerful herbicides that have shown marked improvement in grasslands on the farms tested, he said.

Here's how the new approach to grasslands works:

1. The farmer lets his cattle graze the grass area heavily, getting the old growth down to a minimum. Then, during mid-summer, he applies a soil sterilant to the sod, killing all growth, and leaving the remaining organic matter as a mulch for the surface. Materials used in the tests cited by Mr. Sprague were TCA and dalapon.

2. Next the area is furrowed, in a much shorter time than it takes without the use of herbicides, the research specialist said.

3. The land is fertilized according to its needs.

4. The land is seeded and rolled.

Asked whether the soil sterilants have any adverse effect on the seed, Mr. Sprague said they do not, but emphasized that it is necessary to have a significant rainfall to insure action and eventual dissipation of the chemicals, before seeding. He said the preliminary tests indicate a wide flexibility for the method. The summer looks like the best time to carry it out, he indicated, but added that he thought it would be just as successful if the sterilants were applied in the fall and the area seeded the following spring.

While hailing the method as a possible means of breaking down

farmers' reluctance to build up their pastures, Mr. Sprague said there still are many problems concerned with fertilizers and pesticides that should be answered by the industry, before the program can attain any real measure of success.

"For instance," he declared, "we need to know better ways of using fertilizers for pastures. We also want more specific information about how much lime to use, and when."

Referring to the herbicides used in the grassland program, he said more data on their mode of action and application would be helpful in carrying out the program. He stressed the fact that more testing is needed before the grassland program can be recommended.

In another part of his talk, which climaxed a full day of reports and talks at the conference, Mr. Sprague discussed the problems involved in cultivating and fertilizing pasture on steep slopes. He said wider-wheeled tractors are needed to prevent farmers from rolling off these slopes and that some thought should be given to adapting the New Zealand technique of fertilizing steep hills with helicopters.

Another highlight of the meeting was the first address of Dr. Russell B. Alderfer, new chairman of the soils department at Rutgers, who spoke on "Effects of Physical Conditions of the Soil upon Fertilizer Utilization." Dr. Alderfer came to Rutgers from Pennsylvania State College.

"We've buried a lot of fertilizer," Dr. Alderfer told the group,

**AGRICULTURAL CHEMICALS**

# FOR GRASSLANDS

## *Herbicide, fertilizer tests reported*

"because it wasn't made available to plant roots. He issued a call for exact methods of measuring the physical condition of soils and ways of managing this physical condition to maintain it.

Dr. Alderfer, who replaced Dr. Firman Bear after 14 years at Rutgers, stated that "there is universal recognition of the importance of soil condition, but there are very few things about which we know so little." He went on to outline some problems involved in studying soil physical conditions, mentioning the importance of permeability in allowing water and air to penetrate the soil.

He quoted from tests with Kriolium (which he admitted would be expensive for field use by farmers) to show how yields can be increased for many crops in many types of soils by improving the physical condition of the soils.

"The increased aggregation brought about by the soil conditioner," he went on, "helps roots get to the fertilizer and hence increases yields."

In other talks, the fertilizer manufacturers and dealers heard reports on fertilizer requirements and practices in the state, research with anhydrous ammonia, problems of soil compaction and irrigation and fertilizer relationships.

Summarizing the use of fertilizers on dairy farms, Claude Eby, of the Beemerville Dairy Research Farm, said fertilizer dealers should push sales of plant food for fall pastures,

because the drought earlier in the summer caused farmers to dip into their winter silage. He said it was as important to stress fall application of fertilizers as spring application, and could result in increased sales for the dealers.

On the vegetable farms, according to E. R. Purvis, research specialist in soils, New Jersey farmers don't have to be sold on the value of fertilizer. "Often," he declared, "soil samples show the presence of too much fertilizer rather than too little." He said 5-10-10 still is the basic fertilizer grade for vegetable farms and added that some farmers are using the trace elements, boron, manganese and molybdenum, for soil in which cauliflower is grown.

He stated that while a high phosphorus level is helpful to young plants, tests indicate that later on it does not help much, and can sometimes retard growth.

E. A. Christ, associate research specialist in horticulture, speaking on fertilizer use on fruit farms, said fruit yields generally have been very good in the state during the last few years, with 1954 continuing the trend.

"Fertilizer recommendations have been good and yields therefore have been high in New Jersey," Mr. Christ told the group. Spray materials that are less toxic to trees have contributed to the successful seasons, he added.

He said nitrogen is the limiting factor in fruit fertilization and all recommendations are based on it.

Despite widespread forest fires in the state, the cranberry season looks good, he reported.

Showing slides to point up the value of side dressings of anhydrous ammonia in increasing yields, O. E. Anderson, a graduate student at the college, summarized research with  $NH_3$ . He said the material was the first gaseous substance ever applied as a fertilizer and said recent experiments have shown that if it is applied before a drop in temperature, anhydrous can be held over in the soil for later utilization. Other data show that  $NH_3$  has no lasting effect on soil structure and that side dressing is most advantageous.

The impeding effect of compacted soil on crop yields was explained by J. A. Vomocil, graduate student, who said productivity is lowered by compaction and poor structure. The problem varies with the soil type, cultural practices and other factors, he said.

He urged use of manures, organic matter and cover crops to improve tilth, along with deeper tillage. These practices will encourage roots to penetrate the subsoil and break it up, particularly if fertilizer is located there.

Mr. Vomocil talked about a test with a gamma ray densitometer to measure soil density for determining compaction, and showed slides to illustrate use of the instrument. In conclusion he called for better evaluation of initial and final structure of the soil, by using the device.

"Just enough water to refill the reservoir in the soil is needed to feed plants and prevent leaching of fertilizers," was the statement of G. R. Blake, associate research specialist in soils, in a talk dealing with the relationship of irrigation and fertilizer relationships.

He said it was his personal observation from experimental work with irrigation that "leaching losses of nutrients by irrigation are relatively unimportant."

Dean W. H. Martin of the College of Agriculture and director of the N. J. State Experiment Station, introduced the speakers.★★

[illegible][illegible]

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A black and white photograph of a man in a dark suit and hat, carrying a briefcase, walking past a wall with a grid of numbers. The man is in silhouette, walking from left to right. The wall behind him has a grid of numbers, some of which are visible: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. The numbers are arranged in a grid, with some numbers appearing to be part of a larger sequence or code. The man's shadow is cast onto the wall behind him. The overall mood is mysterious and noir-like.

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## Pesticide and Fertilizer Studies Reported as A. C. S. Divisions Meet in New York

**R**EPORTS on the use of pesticides in the tropics and sub-tropical areas of the Americas, chemical control of plant diseases, weed control, residues, problems relating to trace elements, etc., were featured at the divisional meetings of Agricultural and Food Chemistry and Fertilizer and Soil Chemistry of the American Chemical Society, held September 12-17 at the Hotel Statler, New York.

An interesting point brought out in the symposium on pesticides in tropical agriculture emphasized the interdependence of pesticides and fertilizers. The report by J. S. Niederhauser and D. Barnes, Mexico, indicated that any significant rise in living standards in the tropical countries depends on improved yields of the basic food crops. Higher yields in turn depend upon wider use of pesticides and fungicides, but this in turn has to develop along with the evolution from the small scale subsistence types of agriculture currently in practice to a cash-crop type of agriculture. Before insecticides can be used profitably to destroy pests on crops, crop yields must be improved to make saving worthwhile . . . in other words, better agricultural practices must be adopted and fertilizers and plant nutrients used to increase yields.

Mr. Niederhauser and Barnes indicated also that pesticide materials now available are quite adequate to meet most of the requirements for good control of the prevalent diseases and pests, however, the important current problem is the need for edu-

cation of farmers in the correct use of these materials, and forwarding correct information to the tropical distributor in a language he can understand. Briefly, according to these authors, the improvement of general agriculture will parallel insecticide and fertilizer development.

E. J. Hambelton, Plant Pest Control Branch, USDA, Washington, D. C. discussed the "Factors Influencing the Demand for Pesticides in Tropical Agriculture" and also pointed to the need for an improvement in living conditions and education of the farmer before it will be worth while to try to teach him how to protect his crops and livestock against insects and diseases.

"Pesticides for Cotton in the Tropical Areas" were discussed in a report by J. T. Presley and C. F. Rainwater, Agricultural Research Service, USDA, Brownsville, Tex., who indicated that some 8.75 million acres of land are planted in cotton in the Americas south of the United States, and that U. S. shipments to these areas in 1953 approximated 44 million pounds of technical organic insecticides (including DDT, BHC, toxaphene, aldrin, dieldrin, parathion), 3.6 million pounds of calcium arsenate, and 82 million pounds of nicotine sulfate. Some insecticides are also imported from Europe, particularly, Folidol, a mixture of methyl and ethyl parathion, from Germany.

In reviewing some of the pesticides used for control of specific cotton pests, Mr. Presley indicated that the boll weevil is controlled by aldrin,

calcium arsenate, dieldrin, endrin, BHC, heptachlor and toxaphene; where both the bollweevil and boll worm are to be controlled, DDT may be added to any of the previous materials, except calcium arsenate, and endrin; where a complex of the boll weevil, boll worm and spider mite is to be controlled, sulfur may be added to all of the materials, except calcium arsenate. In the control of pink bollworm, only DDT is recommended; and BHC is reported to be effective against the cotton aphid.

Eaton M. Summers, United Fruit Sugar Co., Preson, Cuba, presented a paper on the use and requirements of "Pesticides in Sugar Cane," and reported that although the current use of insecticides, fungicides, etc. on 8 million acres of sugar cane is only about 6 million pounds annually, the potential market might be 30-40 million pounds, although probable use might be more like 10-15 million pounds per year.

### Weed Control Reports

**I**N reviewing weed control measures in Cuba, Mr. Summers indicated that one Cuban sugar cane grower reported use of .29 gals of 2,4-D concentrate per acre in 1953 over 50,000 acres; while a second grower said he used 1.23 pounds per acre, over 40,000 acres; still a third grower claimed that hand weeding was cheaper. 2,4-D and TCA are used in pre- and post-emergence treatments of weeds on 100,000 acres of sugar cane in Hawaii, and on 250,000 acres in Louisiana. Johnson grass is

controlled with sodium chlorate or TCA, although CMU studies are currently in progress also. In 1953, Florida used the 2,4-D amine salt of Karmex W. Barbados is reported to use no herbicides, while the British Guiana contact spray program is currently awaiting development of a satisfactory mixture, probably CADE (chemically active diesel emulsion).

According to this paper, pineapple disease *ceratostomella paradoxa* is considered one of the most serious diseases of sugar cane. It is controlled in South Africa by use of Aretan in solution; Hawaii uses PMA (phenyl mercuric acetate); while Taiwan uses Granosan.

The most serious sugar cane pest in Louisiana is the sugar cane borer *Diatraea saccharalis*, which in 1953 was controlled by ryania and cryolite. Wireworms in Louisiana, were controlled by 2-3 lbs/acre of chlordane or toxaphene. Florida used 40,000 lbs of chlordane in 1953 for the control of wireworms. Mr. Summers indicated that a combined insecticide-fungicide treatment for speed cuttings and/or soil at planting time is particularly desirable.

R. Orellana, Inter-American Institute of Agricultural Sciences, Turrialba, Costa Rica, in discussing the "Chemical Control of Pests and Diseases of Cacao," reported that substantial control of swollen shoot has been obtained with Hanane, a systemic insecticide containing Dimefox, and of *Phytophthora* rot with copper fungicides. He suggested also that sodium pentachlorophenate and dinitro-o-cresol look promising for control of witches' broom. A general comment on fungicides pointed to the use of adhesives with most fungicides to improve their sticking quality.

F. L. Wellman, also of the Inter-American Institute of Agricultural Sciences, Costa Rica, reported on control of rubber diseases, and advised that Dithane is being used to control South American leaf blight and *Phytophthora* foliage blight. He indicated also that formaldehyde, spargon and zerlate are used for disinfection of seeds, and that the application of copper fungicides is not

recommended because of bad horticultural effects.

"Chemicals are playing an increasingly important role in the control of disease, insects, and weed pests in rice culture" according to E. M. Cralley and F. E. Whitehead, University of Arkansas, Fayetteville, Ark., who further advise that fertilization with potassium is reported to reduce the severity of stem rot, brown spot and blast. Ceresan, Panogen, Agrox, Arasan, Spargon and yellow Cuprocid are used commonly in seed treatment, while N-244 (3-p-chlorophenyl-5-methylrhodanine) is recommended as a seed treatment for the control of white tip. Mr. Cralley and F. E. Whitehead report too that aldrin, chlordane, dieldrin and heptachlor control the rice water weevil, while toxaphene may be used to control the stink bur and fall army worm.

Norwood C. Thornton, United Fruit Co., La Lima, Honduras, reported that pest control in the tropical areas is confined to large acreages in more intensified banana culture. He indicated that panama wilt is a limiting factor in the commercial production of bananas in Central America, and that this is, or can be controlled by flood fallowing. Crag 974 and Dithane D-14 are reported as showing promise in the economic control of infested soils.

Mr. Thornton further advised that Bordeaux mixture 10-10-100 is most effective in the control of *Sigatoka*; other copper fungicides such as Perenox and tribasic copper sulfate have also been useful in control of this disease; while sulfur, and the organic fungicides, notably the dithiocarbamates were found to be effective in dry areas. Dieldrin, aldrin and heptachlor, but not DDT are reported to control the banana borer.

In discussing "Weed Control in the Tropics, with Special Reference to Puerto Rico," T. J. Muzik, Federal Experiment Station, USDA, Mayaguez, P. R., indicated that 2,4-D and its derivatives are the most commonly used herbicides in Puerto Rico, although TCA and CMU have shown considerable promise, and may be used to a larger extent. The herbi-

cides are applied most commonly by a 5-gal. knapsack sprayer, and very little mechanical spraying is done. Mr. Muzik reported that on some plantations in Hawaii 2,4-D has been replaced entirely by CADE. A mixture of 2,4-D, 2,4,5-T and TCA is recommended in Hawaii for brush control.

J. M. Ginsburg, New Jersey Agricultural Experiment Station, New Brunswick, N. J., presenting a paper on the "Rate of Accumulation of DDT in Soils from Spray Practices," reported that the possibility of accumulating large quantities of DDT in soils from spray residues appears more likely in orchards, especially in apple orchards, where from 25 to 40 lbs. of actual DDT may be applied per acre each season, than in field crops such as corn, or on vegetable crops such as potatoes. In general, he said, the rate of DDT disappearance from soils is comparatively slow, lasting several years.

Reports on new acaricides were presented in the course of the 5-day meeting. C. C. Alexander, Geigy Chemicals, Bayonne, N. J. discussed the activity of chlorobenzilate, 2-hydroxy-2,2-bis (4-chlorophenyl) ethyl acetate; while H. F. Wilson and J. S. Barker, Rohm & Haas Co., Philadelphia, presented a paper on a-substituted benzhydrols.

#### Fertilizer & Soil Analysis

THE Division of Fertilizer and Soil Chemistry included several reports dealing with plant response to specific nutrients. J. P. Goode and A. A. Nikitin, Tennessee Corp., College Park, Ga., reported that the extent of acidulation of phosphate rock plays a major role in the assimilation of trace elements by plants. However, both character of reaction of phosphate and the presence of other elements affect trace element availability. They reported also that the degree of interference displayed by the alkalis is governed by both ions, ie hydroxyl ion and cation; thus, in the case of lime, calcium interferes with trace element availability to a much greater extent than does ammonia.

H. P. Cooper, South Carolina Agricultural Experiment Station,

#### AGRICULTURAL CHEMICALS

Clemson, S. C., pointed out that the calcium accumulating crop plants producing highly carbonaceous products, such as cotton, potatoes, or sugar beets, have a relatively high potash requirement, and usually make a highly significant response to potash fertilization.

A report by N. R. Page and H. P. Cooper, Clemson Agricultural College, Clemson, S. C., on the "Less Soluble Boron Compounds for Correcting Boron Nutritional Deficiencies," suggests that the use of less soluble boron compounds may be the answer to use on crops which appear to be sensitive to the sodium borates. Colemanite is one commercial boron mineral which has given most consistent results.

A review of "Some Effects of Surface Active Agents in Mixed Fertilizers" by R. Kumagai and J. O. Hardesty, Agricultural Research Service, USDA, Beltsville, Md., indicated that anionic and nonionic surfactants added to cured superphosphates during the mixing process produced increases in ammonia absorption efficiencies of from 2 to 5%. Doubling the amounts of surfactants caused no further increases. Under similar conditions, anhydrous sodium tripolyphosphate and magnesium sulfate heptahydrate, increased the absorption efficiency of superphosphate as much as 5.5% when added at the rate of 5 pounds per ton. Analysis of ammoniated superphosphates stored for 30 days showed that surfactants had no effect on water-soluble or citrate-insoluble phosphorus pentoxide contents.

The report stated that in general, surfactants added at acidulation time had a greater effect on ammonia absorption of superphosphates and caking tendency of mixed fertilizers than surfactants added during the mixing process.

Peter G. Arvan and Robert P. Langguth, Monsanto Chemical Co., Dayton, Ohio, submitted a paper on "The Manufacture and Properties of Liquid Fertilizers," and reported that liquid fertilizers may be manufactured either by the dissolution of solid-form nutrient sources in water, or by the ammoniation of furnace-grade

phosphoric acid. The liquid fertilizers discussed concerned the primary plant nutrients completely dissolved in water. The nutrients were generally derived from combinations of several of the following raw materials: phosphoric acid, monoammonium phosphate, diammonium phosphate, anhydrous or aqueous ammonia, urea, ammonium nitrate, ammonia-ammonium nitrate liquors, and potassium chloride.

According to Jackson B. Hester, Jackson B. Hester Agricultural Research Laboratories, Elkton, Md., a continuous supply of nutrients to the plant, particularly under adverse conditions, is extremely important. Leaching frames, with the use of potassium chloride as the common denominator, have proved helpful in determining the loss of essential plant nutrients and in offsetting conditions which develop under extremely heavy rainfall.

The practical aspects of "Synthetic Amino Acid Chelating Agents and Their Effects in Agriculture" were considered in a paper by E. J.

Haerl and F. C. Bersworth, Bersworth Chemical Co., Framingham, Mass. and Arthur E. Martell, Clark Univ., Worcester, Mass. According to this report, alkaline soils present a problem of iron deficiency in plant nutrition, which can be treated successfully with the synthetic chelating agent N-hydroxyethylethylenediaminetriacetic acid. Zinc deficiencies under both acid and alkaline conditions may be treated with some success. The problem of the actual process of absorption and translocation of ethylenediamine tetraacetic acid (EDTA) and its derivatives in the plant has not been satisfactorily explained as yet. Indications are that synthetic chelating agents and chelates are beneficial to plant nutrition by making existing soil mineral available to the growth of plants.

A further discussion of chelates and trace elements in agriculture was considered in a paper by A. E. Frost and F. C. Bersworth of the Bersworth Chemical Co., and A. E. Martell of Clark University.

#### Aerial Dusting & Spraying Conference on October 26-27

THE annual Aerial Dusting & Spraying Conference scheduled to be held October 26-27 at the Chinook Hotel, Yakima, Wash. will include a symposium on the "Regulations on 2,4-D Materials" and some 20 other papers concerning the aerial application of agricultural chemicals. As we went to press, the tentative program included the following reports:

Symposium — "Regulations on 2,4-D Materials," L. L. Friedrich, Wenatchee Air Service, chairman.

Auburn Norris, State Dept. of Agric., "Licensing of Custom Applicators"

Charles C. Chester, Director of Aeronautics, "Licensing of Aircraft"

J. E. McCauley, State Dept. of Agric., "Enforcement"

G. H. Ridder, Assistant Director of Agriculture, "Regulations of the Department of Agriculture pertaining to Ag. Chemicals"

Dr. Earle Blodgett — "Observations on weed spray injury to crop plants in Washington during the 1954 season"

Dr. Walter Clore — "Results of 2,4-D studies on grapes"

Stuart Turner — Consulting Agrologist, Seattle, "2,4-D Damage Real or Alleged"

Dr. Lowell Rasmussen, W. S. C. "Pro-

gress Report on 2,4-D Materials."

Nuber, R. L., Assistant Director of Aeronautics — "Aerial Crop Dusting Statistics"

Dr. Roderick Sprague, W.S.C., Wenatchee — "Recent Developments in Aerial Application of Fungicides in North Central Wash."

Dr. E. C. Klostermeyer, W.S.C., Prosser, "Fight your Insect Enemies"

E. J. Newcomer, Entomology Research Branch, U.S.D.A., Yakima, "Biology of Orchard Insects"

James S. Evenden, Chief, Division of Forest Insect Research, Coeur d'Alene, Idaho, "Use of the Airplane in Connection with Forest Insect surveys within the northern Rocky Mountain Region"

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Dr. Wm. M. Upholt, U.S. Public Health Service, Wenatchee, "Health Hazards of Newer Insecticides"

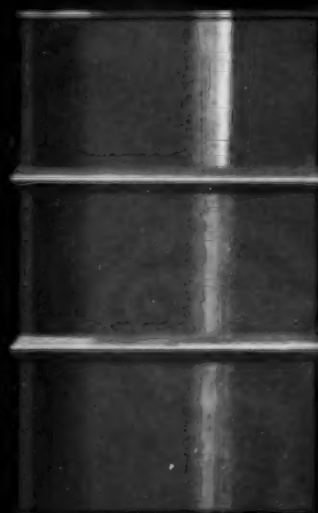
John F. Neace, Marsh Aviation Co., Phoenix, "What is Wrong with Agricultural Aviation and What Have We Done About It?"

Dr. J. C. Chamberlin, C. W. Getzen-daner, Entomology Research Branch and V. D. Young, "Progress Report on Aerial Application of Insecticides"

Kenneth Messenger, Plant Industry Station, Beltsville, Md., "Agricultural Aviation Activities of the Plant Pest Control Branch"



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2. Solvent used \_\_\_\_\_ ppm.
3. For water hardness \_\_\_\_\_
4. Recommended dilution \_\_\_\_\_
5. Lbs. toxicant/gal. of concentrate \_\_\_\_\_
6. Desired emulsion stability \_\_\_\_\_
7. Shelf life period expected \_\_\_\_\_
8. Ease of dispersion important? \_\_\_\_\_
9. Packaging: bulk \_\_\_\_\_ or small container \_\_\_\_\_
10. How is concentrate mixed and evaluated in laboratory tests? \_\_\_\_\_



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# DOES FERTILIZER PAY TODAY?

By W. R. Allstetter\*

Vice President, National Fertilizer Assn.

THERE is a two-way relationship between farm profits and fertilizer usage. On the one hand proper fertilizer usage increases farm profits. On the other hand higher farm profits mean the farmer can buy more fertilizer. In times of good farm prices and good weather, everyone is agreed that farm profits and fertilizer usage make a fine team. Each helps the other. However, some people have raised a question about the desirability of heavy fertilizer usage when conditions are less than ideal. In South Carolina, farmers have suffered seriously from dry weather, and the outlook is clouded by farm surpluses, acreage limitations, cross compliance, and an uncertain crop price prospect.

In view of these complications it might be well for us to take another look at the fertilizer-farm profit relationship as it applies to South Carolina conditions today. During the 1953 meeting of the South Carolina Plant Food Educational Society, Russell Coleman, NFA president, showed a series of charts which compared current average fertilizer usage and yields with recommended usage and potential yields. He showed that with correct farm practices including recommended rates of fertilization the following increases in average yields could take place in South Carolina:

Since last year, the Clemson College authorities have supplied detailed data on what such yield increases might mean in terms of production costs and profits per acre to the grower. The college people have shown again that as yields go up, profits rise even faster. This is because certain fixed costs have to be charged against a crop whether the yield is high or low. Cotton is a good example. Average fixed costs for producing cotton in South Carolina are estimated by Clemson College to be \$45.22 per acre whether the yield is one-half bale or a bale and a half to the acre. These costs break down as shown in table 2.

TABLE 2  
Typical Fixed Costs\* Growing Cotton

Land Charge	\$ 5.00
Man Labor	16.50
Tractor Cost	12.56
Seed	3.00
Poison	5.40
Other Machinery Cost	1.76
Taxes, Insurance, etc.	1.00
Total Fixed cost per acre	\$45.22

\*Prepared by Clemson College NFA Co-operating.

When these fixed costs are taken into account, the comparison of costs and profits on cotton fertilized at two different levels looks as shown in table 3.

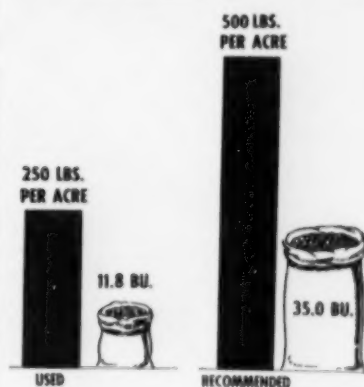
TABLE 1

	Avg. per acre appl. of fert.	Avg. per acre Yield	Recom. per acre fert. application	Potential Yield
Cotton	550 lbs.	275 lbs. lint	800 lbs.	500 lbs. lint
Corn	280 lbs.	21.8 bu.	750 lbs.	50 bu.
Soybeans	250 lbs.	11.8 bu.	500 lbs.	35 bu.

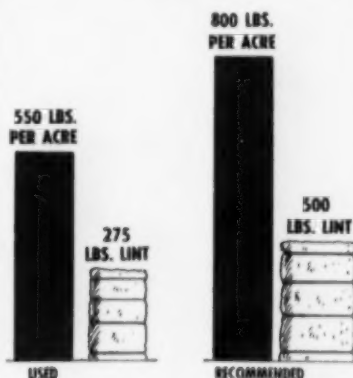
To obtain these yields, a good all around job of fertilizing would be necessary.

\*Delivered September 18, 1954, by W. R. Allstetter, vice president of NFA, at the fifth annual meeting of the South Carolina Plant Food Educational Society, Clemson, South Carolina.

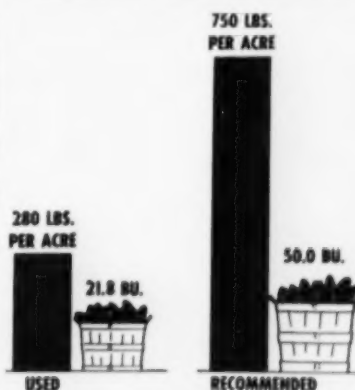
SOUTH CAROLINA SOYBEAN YIELDS WOULD BE HIGHER IF FARMERS FOLLOWED CLEMSON COLLEGE FERTILIZER RECOMMENDATIONS\*



SOUTH CAROLINA COTTON YIELDS WOULD BE HIGHER IF FARMERS FOLLOWED CLEMSON COLLEGE FERTILIZER RECOMMENDATIONS\*



SOUTH CAROLINA CORN YIELDS WOULD BE HIGHER IF FARMERS FOLLOWED CLEMSON COLLEGE FERTILIZER RECOMMENDATIONS\*



Based on 1953 data.

Prepared by the National Fertilizer Association.

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TABLE 3

	Low fertilization	Recom. fertilization
Fixed cost per acre	\$45.22	\$ 45.22
Fertilizer cost per acre	14.75	27.25
Picking cost " "	28.00	47.90
Ginning " " "	5.49	9.40
Interest " "	1.70	2.79
Total " "	95.16	132.54
Yield in lint " "	292 lbs.	500 lbs.
Value of " " " **	96.07	164.50
Net cost (Costs less value of seed)	80.56	107.56
Profit per acre	15.51	56.94
Cost per lb. of lint cotton	.28	.22

\*\*Lint @ \$.329/lb. Seed @ \$50.00/ton. Prepared by Clemson College, NFA Cooperating.

The difference between corn and cotton is that in South Carolina corn is a much less profitable crop at either the low or the high level of fertilization. At average yields, corn production in South Carolina is a losing proposition if interest on investment and labor are deducted. Even when grown according to college recommendations most farmers won't get rich from corn, at least without irrigation. The fact that over 1,200,000 acres of South Carolina land are planted to corn is food for thought.

Soybeans present quite another picture. Planted this year on only 182,000 acres, soybeans appear to have great profit possibilities. They respond well to fertilizer in this state. Top yields here compare favorably with those anywhere in the nation. Table 5 worked out in cooperation with Clemson College authorities, compares the per acre costs and profits from soybeans grown under average conditions with those for the same crop grown under recommended conditions.

What about surpluses? Won't these high yields defeat the farm pro-

gram? What about cross compliance, under which the total acreage in cash crops is limited? Won't these restrict the raising of adapted crops such as soybeans? Data from Clemson College indicates that at least theoretically, there are solutions to some of these difficulties.

In cotton, for example, South Carolina harvested 1,175,000 acres of cotton in 1953 and 870,000 acres in 1954. In 1953 the total crop amounted to 695,000 bales. The Clemson estimates indicate a profit of \$18 million with cotton at \$.329 per pound. What would happen if the acreage were slashed to 400,000 and at the same time college-recommended fertilization and other practices were applied to every acre? The total output would drop 38% to 400,000 bales. This would help the "surplus" situation. But instead of hurting the profit picture, the change would help it. The profit would increase 22% to \$22 million. Of course, we are talking about a theoretical ideal here. But if these figures are correct, even under ideal conditions, then they set up worth-while goals.

How about soybeans? Certainly soybeans are not in surplus. A recent look at the market showed that November futures were selling for \$2.75 per bushel. (Price of \$2.30 has been used in the two tables). It looks as if South Carolina farmers would be fully justified in planting more soybeans.

Comparing the profit picture for the present 182,000 acres grown under average conditions, with that for 400,000 acres grown according to college recommendations, production would shoot up over 600%, to 14,000,000 bushels; profits would rise from \$1,115,000 to \$19,000,000, and profits per acre would compare favorably with those derived from cotton.

These Clemson College data indicate that correct fertilization is the cornerstone of a sound farm program today in South Carolina. Occasionally the suggestion is made that the way to cure the surplus problem is to quit using fertilizer. This would undoubtedly be effective, just as it would cut down production if we destroyed all farm machinery and prohibited the use of pesticides and good seed. It is nonsensical, however, to suggest that farm problems should be solved by cutting efficiency. A more realistic approach is to encourage more efficient production so that the farmer can make more money per bale, per bushel, or per ton. If he receives a higher profit for each unit he produces, obviously he can maintain or even increase his income with the production of less units.

In achieving lower unit costs and higher efficiency, fertilizer is an indispensable tool. Strictly speaking, fertilizer is more important to the farmer today than it was in the lush period 3 to 6 years ago.★★

TABLE 4  
Typical Per Acre Costs\* and Profits

	Fert. Cost	Fixed Costs	Total Cost	Yield	Value of Crop**	Cost Profit Per bu.
Low rate fertilization	\$ .40	\$17.13	\$33.32	21.8 bu.	\$32.70	\$ .62 \$1.53
Recommended rate fertilization	22.50	17.13	58.02	50 bu.	75.00	16.98 1.16

Prepared by National Fertilizer Assn.  
\*Data Supplied by Clemson College.  
\*\*Corn @ \$1.50/bu.

TABLE 5  
Typical Per Acre Costs\* and Profits

	Fert. Cost	Other Costs	Total Cost	Yield	Value of Crop**	Cost Profit Per bu.
Average fertilizer	\$ 5.00	\$16.01	\$21.01	11.8 bu.	\$27.14	\$ 6.13 \$1.78
Recommended rate fertilizer	10.00	21.89	31.89	35 bu.	80.50	48.61 .91

\*\*Soybeans @ \$2.30/bu.

## LISTENING Post

### Dry Rot of Gladiolus—Its Control in Storage

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Epidemics and Identification Section, Horticultural Crops Research Branch, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller



FRANK A. Haasis, of the Vegetable Research Laboratory, Castle Hayne, North Carolina, states that although dry rot of gladiolus, caused by the fungus *Stromatinia gladioli*, is not a serious disease of gladiolus in eastern North Carolina at present, it is nevertheless frequently observed and in some instances losses have been considerable both in the field and in the storage house.

Recent tests at the Vegetable Research Laboratory resulted in very good control of dry rot by immersing corms in a suspension of Ceresan-M shortly after harvest, and fair control by steeping corms in Dow 9B or Dovicide B.

Picardy corms were harvested on November 28 and 36 hours later were cleaned and obviously diseased or injured corms discarded. The apparently healthy corms were mixed thoroughly and divided into samples of 25 corms each. The fungicidal treatments, listed in Table 1, followed immediately, with 18 replicate lots comprising each treatment. Thereafter the corms were placed in trays and stored in an unheated but frost-proof shelter until March 5 when disease readings were made.

After storage the variously treated lots of corms were planted in the field in a randomized triple-lattice. Planting and cultural practices were

similar to those used by commercial growers except that it was impossible to provide adequate irrigation when needed. The new crop of corms was harvested and yield data recorded.

Immersion of gladiolus corms, shortly after harvesting and cleaning, for 5 minutes in Ceresan-M at a concentration of 1 pound to 100 gallons of water practically eliminated development of corm lesions resulting from the dry rot disease (Table 1). Ceresan-M proved significantly better than all other materials tested. Fair control of the disease was also achieved by steeping the corms for 1 hour in equivalent concentrations of zinc

trichlorophenate (Dow 9B) or sodium trichlorophenate (Dovicide B); the extent of control was equal with these two chemically related compounds. Neither immersion in New Improved Ceresan for 5 minutes at a concentration of 1 pound to 100 gallons of water nor thorough surface coating of corms with Spergon reduced the incidence of disease materially. Throughout the growing period periodical observations revealed no difference in growth performance which could be attributed to treatment, except as treatments influenced losses due to *Fusarium oxysporum* f. *gladioli*.

After harvest, the corms were allowed to dry for two weeks and then weighed. The average corm weight of each lot was determined and analysed statistically in order to detect weight differences attributable to the prestorage treatments. Owing to the planting arrangements the block effects were eliminated. Hence, the means for average corm weight (Table 1) have been adjusted for block effect. On the basis of yield per individual corm, Dow 9B, Dovicide B, Ceresan-M, and Spergon 98% were virtually non-injurious, whereas New Improved Ceresan may have caused injury.

The growing season was excessively dry which probably accounts for the inordinately low corm yield.

It appears that a sanitizing treatment of a Ceresan-M dip applied shortly after corn harvest will effec-

Table 1. Control of dry rot of gladiolus with fungicides applied as prestorage treatments, and effect of treatments on subsequent corm production.

Chemical	Concentration Pounds/100 gal. water	Duration of steep in minutes	Mean percent disease as sin-√x	Average number of corms harvested per plot	Average weight per corm after harvest (grams)
Dow 9B—50%	3	60	7.6	16.6**	20.72
Dovicide B—85%	1 3/4	60	7.7	19.0	20.01
Ceresan-M—7.7%	1	5	2.6	18.4	19.28
N. I. Ceresan—5%	1	5	13.5	18.2	16.61
Spergon—98%	—*	—	15.4	11.8	23.68
None	—	—	16.9	6.8	16.38
L.S.D.'s .05			4.74	—	3.71
L.S.D.'s .05			6.27	—	4.94

\*Corms heavily coated with dust.

\*\*Variance among means due chiefly to losses from *Fusarium*.



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tively reduce storage loss from dry rot in gladiolus without jeopardizing subsequent corm growth.

#### Antibiotics For Apple Fire Blight

**R.** S. Kirby, Extension Plant Pathologist at Pennsylvania State University, reports that this spring apples and pears in south-central Pennsylvania were attacked by the worst outbreak of fire blight (caused by the bacterium *Erwinia amylovora*) observed there for many years. In some apple orchards near infected pear trees half to two thirds of the crop was lost.

One control experiment testing antibiotics was located in an apple orchard where fire blight was severe. In the ten-year-old orchard (mostly Opalescent and Gravenstein) a block of 115 trees was sprayed twice in bloom with Agrimycin normal strength at 9.34 oz. per 100 gallons (250 gallons covered 115 trees or 2.2 gallons per tree). A similar block adjoining the first was sprayed with pheno-lead in petal fall through second cover. The remainder of the orchard was sprayed with captan 2 lbs. in the regular schedule. Agrimycin and pheno-lead sprayed areas received captan in all other regular sprays.

The first spray of Agrimycin was applied April 23, when 20 percent of the flowers were open and Gravenstein was in full bloom; at the second spray on April 27 Opalescent was in full bloom and all petals had fallen from Gravenstein.

On June 3, when green apples were about 1 1/4 inches in diameter, the number of blighted flower clusters per tree were determined. It was estimated that each tree had between 800 and 1000 flower clusters or points of possible infections. Results are as follows:

#### AGRIMYCIN

Counts were made on 26 trees taken at random. The number of blighted flower clusters for each tree was:

	Average number infections per tree
Gravenstein—11 trees counted: 0,0,0,0,0,0,1,1,2,2,— total 6 blight infections	.54
Opalescent—15 trees counted: 0,0,0,1,0,0,0,2,1,1,3,0,1,0,0,0,— total 18 blight infections	1.2

#### PHENO-LEAD

Opalescent—6 trees counted: 5,3,7,70,80,6— total 171 blight infections	28.5
Gravenstein—5 trees counted: 11,20,53,202,570— total of 856 infections	171.2

#### REGULAR SPRAY SCHEDULE

Opalescent—2 trees counted: 25,13— total 38 blight infections	19.
Gravenstein—6 trees counted: 16,166,231,29, 143,233— total 814 fire blight infections	135

#### Comparison of Agrimycin, pheno-lead, and regular spray schedule for control of fire blight on apple in a demonstration orchard in Pennsylvania.

Treatment	Average number of blight infections per tree		
	Opalescent	Gravenstein	Total
Agrimycin (2 bloom sprays)	1.2	.54	.92
Pheno-lead	28.5	171.2	88.5
Regular Schedule	19.	135.	106.5

On the Agrimycin-sprayed trees blight infections usually failed to grow any appreciable distance down the spurs or into the branches. The growth of fire blight through the spurs and into the branches was pronounced in the regular and pheno-lead blocks.\*\*

#### Bean Beetle in Idaho; Fall Armyworm Late Season Crop Threat

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Economic Insect Survey Section, Plant Pest Control Branch, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.



#### By Kelvin Dorward

**A** SMALL infestation of Mexican bean beetle larvae was found in a bean field approximately 2 1/2 miles northwest of Twin Falls, Idaho, during August. As far as known this is the first report of this serious bean pest from Idaho. All infested bean plants and plants surrounding the infestation were pulled and burned and the field treated with insecticide. Continued survey has failed to reveal additional infestations.

The Mexican bean beetle probably came to the U. S. from Mexico and has been known in the western part of the United States since about 1850. With this find the insect is now known to be in the west and mid-western states of Arizona, New Mexico, Colorado, Wyoming, Utah, western Texas, western Nebraska and western South Dakota.

An isolated infestation was found in Ventura County, California in 1946 but a regulatory control program was immediately initiated and for the past several years no infestations have been found. In the east-

ern United States the Mexican bean beetle was first discovered in Alabama in 1920. Since then it has spread to most of the important bean-growing districts of States east of the Mississippi. Infestations have also been reported from Iowa, Missouri and Arkansas.

Other reports concerning the Mexican bean beetle received during late August and early September indicate that damage was widespread in northeastern Colorado, severe in garden beans of Laramie County, Wyoming and noticeable in several counties of Utah. Infestations were at a low ebb in Florida, control was not required in Tennessee, lighter than normal in Massachusetts, and on the increase in North Carolina, being generally light in the Piedmont area but heavy in the mountains.

#### Tomato Russet Mite

**T**HE tomato russet mite which was virtually unknown in the eastern United States until year before last has been reported from both

Virginia and North Carolina within recent weeks. The Virginia infestation was found in Arlington County and the transplants had been grown locally. The North Carolina infestation was reported from Morganton but the transplants were evidently brought into the State. In New Jersey the mite has not been as severe this season as in 1953. The same is true in counties of Pennsylvania but control measures have been necessary. The pest was serious in the central area of Indiana during late August and early September and caused trouble in tomato fields of several Michigan counties. Reports were also received from the California counties of San Diego, Orange and Santa Barbara.

Other truck and vegetable pests which were of importance during late August and early September included the hornworms. In Arizona damaging numbers were on chili peppers at Amado. Georgia reported the heaviest infestation on foliage and small pods of pimento peppers in Pike and Spalding Counties that had been observed for several years. Hornworms were abundant on tomatoes in the Charleston, South Carolina, area and were infesting tobacco in Maryland and North Carolina. Tobacco hornworm moths were abundant in the Clarksville, Tennessee, area. In several eastern Virginia Counties the two-spotted spider mite infestation on tomatoes was general and the heaviest in recent years. It was expected that the build-up would continue and controls would be needed on late snap and lima beans, cucumbers and peppers.

Mites were reported as causing damage to watermelons in Pennsylvania and Rhode Island, to lima beans and black-eyed peas in Delaware and to eggplant in southern New Jersey. The green peach aphid was in damaging numbers on suckers and terminal growth of tobacco in Fayette and Bourbon Counties, Kentucky. Spotty heavy infestations were on tobacco in St. Marys County, Maryland. This aphid was also building up on potatoes in Rhode Island. Other aphids reported in September included the potato aphid which was numerous on

potatoes and tomatoes in New Jersey and building up on potatoes at Bath and Paw Paw, Michigan. During early September populations were relatively small for the time of year at Presque Isle, Maine. In New York there was a build up on tomatoes in Rockland County and on some seed lettuce fields in the State of Idaho.

#### Codling Moth Continues Active

**C**ODLING moth activity was extending into the early part of September. In Indiana injury due to third brood larvae has been extremely severe and much higher than, at least, since 1944. There are numerous orchards in southern Indiana where growers have not obtained satisfactory control and where control was obtained it was by continuous and thorough coverage during all of August and the first week of September. Third brood adults were extremely active from August 4 to September 10, with peak flights being August 18-19, August 24-26 and September 1-2. In North Carolina mountain counties, damage was severe in uncontrolled orchards or those adjacent to nearby orchards which were neglected. Damage was above normal in Utah orchards where controls were not carefully timed, and moths were flying later than usual in some areas. In contrast to the preceding discussion, Massachusetts reports codling moth is not of as much concern as usual.

#### Cereal and Forage Insects

**A**MONG the cereal and forage insects causing damaging during late August and early September, the fall armyworm was very important. Reports of damage from this pest were from Arizona to Delaware. In Arizona the fall armyworm was abundant on some plantings of sweet corn and sorghum in Maricopa County. Late planted corn in the central area of Kansas continued to be damaged, with Texas reporting damage to grain sorghum and corn in Dimmit, Moore and Uvalde Counties. Infestations were general over Arkansas with damage severe to corn in some counties. In southern Illinois the pest was apparently on the increase with damage serious to small

corn. Louisiana reported some serious infestations and although the Tennessee infestation was general it was considered light. Populations up to 125 per square foot on Argentina bahia grass were reported from Madison, Florida. Other crops severely attacked in Florida included millet, soybeans, Coastal Bermuda and pasture grasses. In Georgia millet, hegari, peanuts, kudzu, soybeans, Bermuda and pasture grasses were being damaged in various localities. Young corn throughout North Carolina was heavily infested as was the case in Delaware. The Maryland infestation was lighter.

The true armyworm (*Pseudaletia unipuncta*) which reached outbreak proportions during the past two years is still very active in some areas. During early September in the northern two-thirds of Missouri heavy damage to volunteer small grains, fescue and brome grass was caused by third generation larvae. Counts ranged up to 100 larvae per square foot in small grain fields. Parasitism was heavy on the larger larvae which were principally fifth instar. This species was also reappearing in many alfalfa and clover fields of western Illinois. Damage continued in Utah and Wyoming. Moths taken at light traps in Arkansas were heavy during August and in Tensas Parish, Louisiana, and exceeded the catches taken during spring flights.

The corn earworm was causing damage in many states during early September. Infestations in canning corn in Utah averaged 33 percent and sorghum heads in the Stewart Area of Arizona were damaged. A rather severe outbreak in milo and sorghum heads occurred in Kansas, with counts in some Riley County fields reaching 16 larvae per head with 40 to 50 percent of the heads infested. Field corn in southeastern Missouri was reported to have 90 to 100 percent infested ears and some injury to soybean pods was occurring. Moth and egg laying activity increased steadily and was expected to continue until frost in Illinois. Moth flights in Illinois were the heaviest in many years. In the northern half

(Continued on Page 115)

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## Letters To The EDITOR

**A**GRICULTURAL CHEMICALS received an inquiry recently from a reader in Colorado who indicated his firm is considering adding some form of nitrate solutions to its list of products. They are somewhat undecided, however, as to whether it would be better, in their particular area, to offer solutions or to follow the strong national trend toward anhydrous ammonia. They asked us to help them with comments on comparative advantages and disadvantages. With the feeling that the questions which they raise are of wide, general interest to those in the fertilizer field, we reproduce their letter, our reply, and suggestions we were able to assemble for them from other informed sources.

"Agricultural Chemicals"  
175 Fifth Ave.  
New York City 10, N. Y.  
Gentlemen:

After dealing in solid fertilizers for several years, we are seriously considering adding some form of nitrate solutions to our services.

Several of the solutions have their attractions but we are intrigued with aqueous ammonia applied by injection. Aqueous does not seem to have the corrosive qualities of nitrate solutions, nor the storage problems, nor the dangers of the high pressure anhydrous ammonia. Aqueous offers other advantages in that less specialized and expensive applicator equipment is necessary.

Now the question is this:—with the apparent advantages of aqueous, why is it not more popular east of the Rockies? What serious fault may we be failing to note?

It seems quite popular in California, but seldom heard of in other sections. Why? Usually there is a reason for lack of interest in a given item or system. In this case, we are unable to see why. Is it merely because the idea is new, as yet?

Shipping in anhydrous, putting it through a converter to make aqueous for local distribution seems so simple, and the advantages so obvious, we wonder where the hidden "hook" may be.

Hence this letter to you. We are wondering if your staff may have information on comparative advantages or disadvantages which you could make known to us. Any help you could give would be much appreciated.

Yours sincerely,  
A Subscriber to  
AGRICULTURAL CHEMICALS

"Our Reply"

Gentlemen:

Answering your query regarding the use of aqua ammonia, a brief history of the development of the use of agricultural ammonia in any of its forms might seem to be in order.

Anhydrous ammonia, or  $\text{NH}_3$ , has been known for many years as a chemical compound of nitrogen and hydrogen. Shell Chemical Corporation was the real pioneer in the use of  $\text{NH}_3$  as a nitrogen fertilizer. This was about twenty years ago. Its use for this purpose was quite slow in being adopted by California farmers until Shell instituted a technical advisory service and through it developed the two principal current methods of application — metered into irrigation water and injected to the desired location in the soil. The use of anhydrous ammonia injected in the soil did not gain momentum until 1943. It can be seen from the foregoing that the use of agricultural ammonia in any form is comparatively new when you consider that other types of commercial fertilizers have been in use in this country for somewhat more than one hundred years.

It is still standard manufacturing procedure to produce this material in the form of anhydrous ammonia. A small percentage of this output is recently being converted usually to 20% aqua ammonia, making use of 25,000 gallon conversion plants as a rule. This produces a highly stable material which can be stored in ordinary tanks or barrels. Whereas,  $\text{NH}_3$  must be stored and transported in pressurized cylinders. Aqua ammonia can be easily applied to the soil either in irrigation water or by direct injection in exactly the same manner that  $\text{NH}_3$  is applied. The conversion in small local plants of  $\text{NH}_3$  to aqua ammonia is now being supplemented in the west by production from a new plant of Brea Chemicals, Inc., which has a capacity of 60,000 tons of  $\text{NH}_3$  per year. All of this is being converted by Brea to the form of aqua ammonia before sale to the ultimate consumer, the farmer.

The use of agricultural ammonia, and particularly of aqua ammonia, may well be so new that farmers in other areas have not as yet accepted it for their own use to the same degree as has been the case on the Pacific Coast and Hawaii.

Sincerely,  
SIDNEY H. BIERLY  
AGRICULTURAL CHEMICALS

"Agricultural Chemicals"  
175 Fifth Ave.  
New York City 10, N. Y.

Gentlemen:

In order better to answer the questions raised by your subscriber it would be helpful to have a little more specific information as to just what is wanted, particularly in regard to the type of solution in which they are interested. Some ten different solutions are now available for direct application.

Anhydrous ammonia is available in the general area east of the Rockies and is being used by farmers. It is, of course, a much more concentrated material than aqua ammonia and its use does not involve the transporting of a lot of water either to or on the farm. Handling of anhydrous ammonia on the farm has proved to be simpler than was initially expected.

Agronomically, of course, it makes little difference whether the aqua or anhydrous forms are used. It is suggested that your correspondent assess the attitude of local county agents and State extension workers toward the various nitrogen solutions as used in that area. If your correspondent is specifically interested in aqua ammonia, the converter approach at his local plant, is probably best. It is then a question of whether aqua or anhydrous ammonia supplies the cheapest form of nitrogen to the farmer.

Cordially,  
COLIN W. WHITTAKER  
Fertilizer and Agricultural  
Lime Section  
USDA, Beltsville, Md.

"Agricultural Chemicals"  
175 Fifth Ave.  
New York City 10, N. Y.

Gentlemen:

This is in reply to your letter of August 10 requesting information on the comparative advantages of aqua ammonia with other liquid forms of nitrogen for direct application. Below I have attempted to summarize some of the major advantages and disadvantages of the various materials stemming from their differences in chemical and physical properties.

Of course, the agronomic aspects such as soil type, specific crop needs, terrain, etc. must also be taken into account. The local agricultural authorities are best able to discuss these aspects.

Non-pressure nitrogen solutions are principally solutions of ammonium nitrate, urea or sodium nitrate in water. They usually contain both the ammonia and nitrate forms of nitrogen. They may be applied directly to the surface thus reducing tractor power, time and gasoline requirements. Some forms are more concentrated in nitrogen than aqua ammonia. Since they develop no pressures, safety hazards are reduced and less expensive application and storage equipment is required than that used in anhydrous ammonia application. They are corrosive to many common materials of construction. They salt out at higher temperatures than anhydrous or aqua ammonia.

The more common low pressure solutions are either water solutions of ammonia and ammonium nitrate or urea, or the common aqua ammonia. These solutions generally require subsurface application. Aqua ammonia is the least concentrated, but it is also the least corrosive.

(Turn to Page 117)

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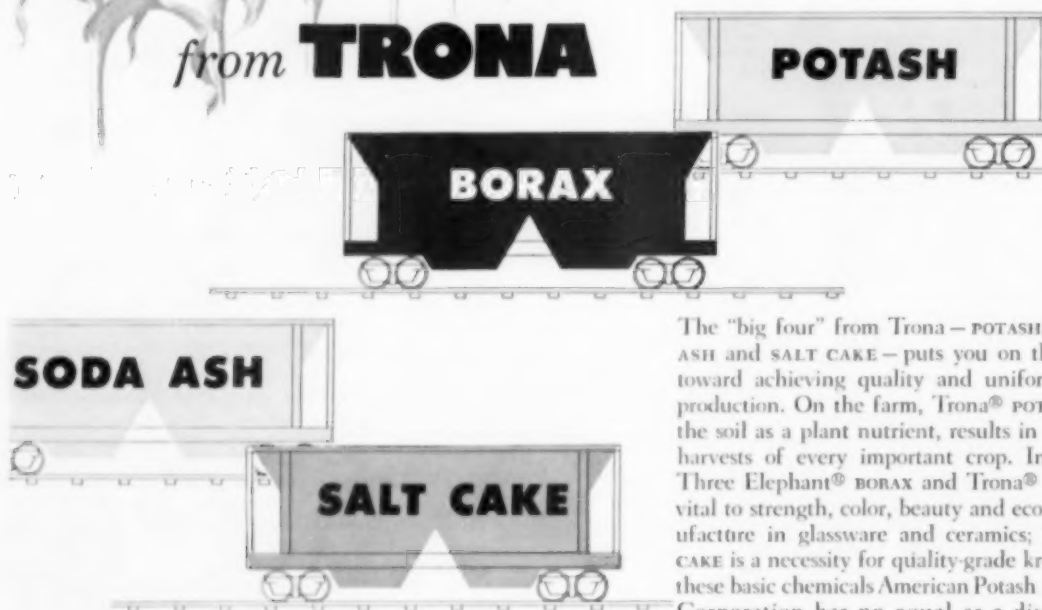


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Weed growth checked by the paper mulch around tomato plant. Picture taken 5 weeks after mulch application.

## A New Method of WEED CONTROL

*By C. L. Hamner and G. S. Rai*

Michigan State College  
East Lansing, Michigan

**T**HE use of chemicals in weed control has not always been 100 percent satisfactory. The herbicidal activity of various compounds under a wide range of environmental conditions has not been fully established. As a result, the highly toxic activity of many herbicides has often resulted in crop injury. Therefore, there is a real need for a practical non-toxic method which can be used effectively and economically as a weed control measure.

A newly developed method which promises to be a success with a variety of crops consists in applying paper pulp around the plants. When the paper dries, it forms a hard cardboard-like protective shield which prevents the growth of weeds around the plant. It also acts as a mulch for the conservation of moisture needed by growing plants. Preliminary trials conducted in Michigan on paper mulch indicate its usefulness

as a non-toxic practical method for weed control.

The procedure in making pulp consists in soaking old newspapers over a sufficiently long period and then agitating the material by mechanical methods until the paper is shredded to form pulp. The consistency of the mixture can be adjusted by the addition of water. The pulp, thus obtained, is spread around the growing plant. The water in the pulp either soaks into the soil or evaporates, leaving a hard cardboard-like mulch which discourages the growth of weeds throughout the entire period of crop growth.

This method of weed control can be used with almost all types of crops, vegetables, nursery stock, flowers, etc., since it gives the needed protection from weed growth.

The use of heavy mulches has long been considered as a method for weed control. The materials employed are straw, sawdust, hay, peat moss, etc., all of which exclude the light and thereby prevent the top growth of weeds. The thickness of the mulch is partly determined by the looseness

of the material and partly by the nature of the weeds. However, in all cases, the mulch layer has to be sufficiently thick to discourage the growth of perennials, biennials, and annual weeds. In general, the mulches of straw, hay, and manure have proved to be unsatisfactory, because they do not provide complete cover, often necessary for weed control.

The use of paper mulch in agriculture was started in the Hawaiian Islands on sugar cane. Later on, large-scale application was extended to pineapple because of the high cash value of the crop. The method of application used in pineapple culture consists in laying heavy paper on the soil and then planting pineapple slips through holes spaced at intervals along the paper. This method has special merit since it eliminates weed growth and permits the growth and development of the young plant under ideal conditions where the availability of soil moisture and nutrients is extended over a long time.

The paper mulch methods used in pineapple culture are economically  
(Continued on Page 117)



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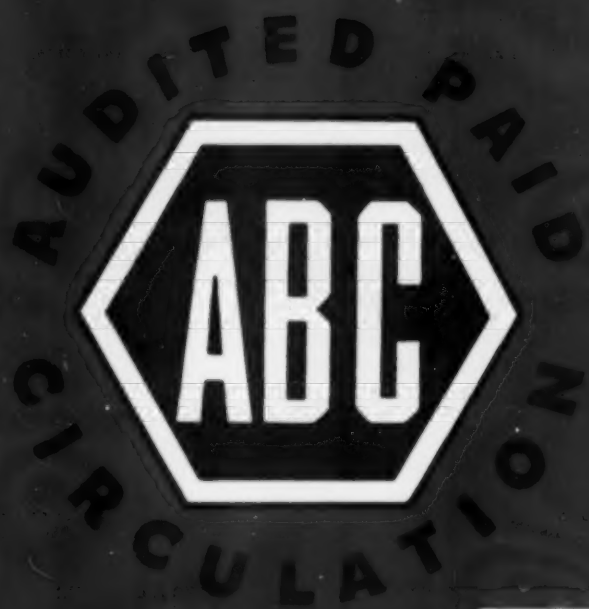
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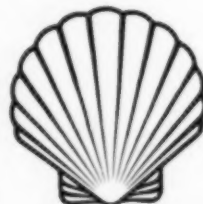
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## Technical SECTION

### Manufacture of Fertilizer-Pesticides\*

FERTILIZER-PESTICIDE mixtures have increased considerably in popularity in recent years, so that as of June, 1954, use of one or more kinds of fertilizer-pesticide mixtures was recommended or approved in 26 states distributed in all but one of the state regions. Fertilizer-pesticide mixtures have official sanction in all the South Atlantic and West North Central States and in all but one each of the East South Central and Pacific States, but in none of the West South Central States. It should be noted, however, that sanction of the mixtures in the 26 states has generally been accompanied by many reservations on the part of the agricultural officials, even in most of the states where considerable quantities are used.

The principal compounds recommended for inclusion in fertilizers to control soil insects are aldrin, heptachlor, chlordane and dieldrin, and DDT. For the control of wireworm and rootworm infestations, several states recommend applications of .5 to 6 pounds per acre of aldrin, dieldrin and heptachlor, .5 to 22 pounds of chlordane, or 1 to 25 pounds of DDT, depending on the state, the kind of soil, insect, and crop, and the method of application (row or broadcast, surface or worked in). Herbicidal mixed fertilizers containing 2,4-D have also been marketed widely and are increasing in importance.

Addition of insecticides to fertilizers is usually to mixtures containing two or more of the primary plant nutrients, but in a few instances, additions to straight materials . . . such as ammonium sulfate, superphosphate, potassium sulfate, and gypsum are

made. 32 companies reported that insecticides were incorporated in at least 48 grades of mixed fertilizers in 1953-54.

Several forms of the different kinds of insecticides have been used, or are available, for mixing with fertilizers. These include both dustless and nondustless powders, granular products with a particle-size range of 30 to 60 mesh, solutions in low-viscosity solvents, and emulsion concentrates. In current practice, the powdered products appear to be used most widely; for example, powders containing 20 per cent of aldrin, 25 to 40 per cent of chlordane, or 50 per cent of DDT. The trend is said, however, to be in favor of granular fertilizers. Seldom, if ever, does a fertilizer-insecticide mixture contain more than one kind of insecticide.

In the manufacture of fertilizer-insecticide mixtures, it is the usual practice to add the insecticide to the cured fertilizer in a separate operation just before the mixture is bagged or loaded for shipment. This is generally done in the same kind of mixing equipment used for preparing the fertilizer itself, but with a several fold increase in the mixing time. Currently, most plants that prepare fertilizer-insecticide mixtures do so only at the specific request of individual customers, and they do not carry such mixtures in stock.

Fertilizer manufacturers, in general, have not been enthusiastic over fertilizer-pesticide mixtures, because the preparation and distribution of such mixtures involves a number of problems. Important considerations are the compatibility of pesticides with fertilizer materials, the stability of the mixtures, and the hazard to

plant workers. Insofar as stability of pesticides in fertilizer mixtures is concerned, research has shown that 2,4-D added to superphosphate and mixed fertilizers largely retains its potency even under rather adverse conditions of preparation and storage of the products; DDT is stable in contact with several fertilizer materials and mixtures at elevated temperatures, at least for short exposure, but is catalytically decomposed by dolomitic limestone. Aldrin, chlordane and perhaps dieldrin and heptachlor are reported to be compatible with fertilizer and to be stable in mixtures, but experimental evidence in support thereof appears to be lacking in the literature.

Still another problem is that of possible hazards to human health in the preparation and handling of pesticide-fertilizer mixtures. Furthermore, the manufacturer who adds pesticides to fertilizers broadens the sphere of his product liability. Thus, he becomes subject to claims arising in connection with either or both the fertilizer and pesticidal constituents.

The demand for fertilizer-pesticide mixtures, nonetheless, will continue to increase so long as their use affords a convenient, economical and reasonably satisfactory way of combining crop fertilization with pest control. On the basis of information supplied by state agronomists, entomologists, and control officials and by fertilizer manufacturers, it is estimated that the consumption of fertilizer-pesticide mixtures in the year ended June, 1953, ranged from 100 tons in the West South Central region to 60,000 tons in the South Atlantic region, and totaled 87,000 tons for the United States and territories.

Information on the registration of fertilizer-pesticide mixtures with state control officials in 1953-54 is not available, but as of July 1954, some 200 to 250 mixtures were registered with the Plant Pest Control Branch, USDA, for interstate shipment by approximately 25 companies.★★

\*From a report on the "Status and Problems of Fertilizer-Pesticide Mixtures" presented by K. D. Jacob, USDA, Beltsville, Md., at the cooperative program of The National Joint Committee on Fertilizer Application and The American Society for Horticultural Science, Gainesville, Fla., September 6, 1954.

### Dry Bean Defoliation

Government clearance on "Endothal" and "Shed-A-Leaf" for use as defoliant on dry beans was announced early in September, and these products along with potassium cyanate may now be used according to the recommendations of the manufacturers. Other defoliants may also be effective, but thus far have not been cleared for general recommendation.

Any row crop sprayer may be used to apply the defoliants, using about 20 to 30 gallons of water per acre. Suggested rates of application are Endothal at 2 to 4 qts/acre; Shed A Leaf, liquid 1½-3 gals/acre, dry powder at 8-12 lbs./acre; and potassium cyanate at 5-10 lbs/acre. *Cornell Veg-News* Vol. 5, No. 7, (1954).

### Citrus Experiments

Researchers at California's Riverside experiment station have been studying the effect of 2,4-D applications to the soil on various citrus rootstock seedlings, and the amount of nitrogen needed to maintain orange yields.

Tests on the rootstock seedlings show that 2,4-D may stimulate root growth. Although some seedlings showed no response, others produced greater density of foliage.

In the fertilizer trials, it became apparent that some orange growers may be using more nitrogen than trees require. In two experiments, yields have been maintained without any added nitrogen for four and five years; other trials indicate, however, that production eventually declines without added nitrogen. The trials show that the critical period in nitrogen level is at flowering and fruit set. *Farm Management*.

### Malathion for Fly Control

Effective control of houseflies in poultry houses by use of malathion spray is reported by the Louisiana Agricultural Experiment Station, Baton Rouge, La. Tests were conducted during 1953 at the station's poultry farm and in local commercial houses. Malathion was used at the rate of 1 lb. of the technical chemical from emulsifiable concentrate with 20 lbs. sugar

per 100 gals. water with "excellent" results in control of both adult flies and maggots.

The report also states that use of TEPP and lindane mixture as baits for fly control gave a high mortality to adult flies for one or two days, but that no larval control was obtained this way. "At the best," adds the report, "only temporary reduction in fly population was possible." Malathion is considered relatively safe to handle and use around poultry, the report comments.

### Leaf Scorch on Lilies

An experiment was designed to test the relations between nutrition and the incidence of leaf scorch on greenhouse forced Croft lilies in southern California. The effects on the incidence of leaf scorch of nitrogen and calcium levels and pH of the soil were in general agreement with results obtained elsewhere. Blasting of flower buds occurred in the high nitrogen series. Moderate nitrogen applications, high calcium, and high pH reduced root rot. Root damage appeared to encourage both root rot and bud blasting; high nitrogen reduced leaf scorch, but increased blasting. In another experiment, fungicidal control of root rot with Iysol-termate and thiram also checked leaf scorch. Abstract of paper presented August, 1954 meeting of the American Phytopathological Society, report by J. G. Bald, A. M. Kofranek, and O. R. Lunt.

### Nematode Damage of Berries

Root lesions resembling feeding scars of ectoparasitic nematodes have been found to be associated with root rot and decline in many commercial plantings of strawberries in New York State. An appreciable increase in plant growth, runner production and yield was obtained in plots fumigated with Dowfume W-85 (ethylene dibromide) prior to planting. A beneficial response from soil fumigation is evident in the test plantings established in the spring of 1954. Paper by A. J. Braun, N. Y. State Agri. Expt. Sta., Geneva, N. Y., presented at 1954 APS meeting.

### Synthetic Fertilizer

A new odorless nitrogen source is currently under study for use on ornamentals. The product is "Uramite", a combination of urea and formaldehyde, said to offer the advantage of nitrogen release over a long period of time and safety because of low solubility. It does not encourage algae growth on the surface of the soil after top dressings are made. Because it is a synthetic, there should be little variation in its properties.

Laboratory and field tests with Uramite, containing about 38% nitrogen, showed that the material was mineralized to the available nitrogen forms over a considerable period. Data obtained in the laboratory indicate that about 10 pounds of Uramite per square foot may be used safely in a single application. Good plant growth was obtained in use on chrysanthemum, carnations, and other ornamentals. O.R. Lunt and R. H. Sciaroni, p. 11, Vol. 8, No. 9, *California Agriculture*, (1954).

### Insecticides in Dipping Vats

Toxaphene, whether in an emulsifier concentrate or a wettable powder, should be employed at a concentration of 0.5 per cent. DDT in wettable powder should also be used at a concentration of 0.5 per cent. For control of lice and horn flies DDT alone is satisfactory, but if animals are being dipped for tick control enough BHC wettable powder should be added to give 0.025 to 0.03 per cent of the gamma isomer.

It is cautioned that both toxaphene and BHC are toxic to farm animals if applied in excessive amounts. Therefore, all water and insecticides should be carefully measured. Furthermore, young animals under 3 months of age and emaciated animals are particularly susceptible to insecticide poisoning, and so should be dipped with special caution.

Toxaphene, DDT, or BHC should not be used on cows giving milk for human consumption. As the insecticides are toxic to fish, care should be taken that material removed from dipping vats does not pollute streams or ponds. *USDA Bulletin* E-880, June, 1954.

### AGRICULTURAL CHEMICALS

## Literature Available

The following list reviews a series of bulletins on fertilizer, insecticide and fungicide recommendations, controls, etc. For the most part, these bulletins and reports are prepared by the various state agricultural experiment stations, and copies may be obtained by writing directly to the respective stations.

**CONTROL OF STORED GRAIN INSECTS** in the North Central States. Discussion of types of damage, influence of geographic location, sources of insects which infest newly binned grain, fumigation procedures and recommendations. 224 pages. Bulletin #425, U. of Minnesota, Exp. Sta.

**MEALWORMS** Habits, life history, directions for laboratory experimental rearing, and control measures. 2 pp. Leaflet #195, USDA, Washington, D. C.

**TOXICITY TO PLANTS OF WOOD PRESERVATIVES AND THEIR SOLVENTS**, by H. W. Hicock and A. R. Olson. Pentachlorophenol should never be used in close proximity to growing plants in greenhouses or cold frames. 4 pp. Circular 189, Connecticut Agri. Exp. Sta. New Haven, Conn.

**VIRUS DISEASES OF PLANTS IN ARIZONA** by P. D. Keener. Analysis of the economic significance of plant viruses and diseases, symptoms, means of transmission, and control measures. 38 pp. Bulletin 256, Agr. Exp. Sta., Univ. of Arizona, Tucson.

**PROCEDURE FOR INSECT PREVENTION AND CONTROL IN PLANTS PROCESSING NONFAT DRY MILK SOLIDS**. USDA, Biological Sciences Branch, March, 1954.

**SCREENING PROCEDURE FOR CANDIDATE FUMIGANTS FOR STORED GRAIN AND GRAIN PRODUCTS**. By N. Dennis and W. Whitney. USDA, Stored Products Section. Bulletin E-878, May 1954.

**COTTON MECHANIZATION . . . .** Recommended Production Practices for mechanically Harvesting Cotton, by J. H. Anderson, W. A. Balk and G. B. Nutt. 24 pages. Discussion of crop residue disposal, seed bed preparation, planting, weed and grass control, insect control, defoliation harvesting. Circular 94, Clemson Agric College, Clemson, S. C.

**HOW TO SPRAY THE AIRCRAFT WAY . . .** a guide for farmers and spray-plane pilots. This bulletin is devoted primarily to aircraft spraying. It gives farmers a basis for appraising the value of aircraft spraying, and tells how to plan spraying jobs to suit individual needs. Discusses equipment, aircraft per-

formance, safety, and calculating pesticide mixtures. 32 pages Farmers Bulletin # 2062, Superintendent of Documents, Washington 25, D. C.

**CHEMICAL WEED CONTROL IN ASPARAGUS, LIMA BEANS, VINE CROPS, SWEET CORN, AND STRAWBERRIES**, by E. M. Rahn. Discussion of materials and methods, experimental details, results and conclusions. 32 pages, Bulletin # 303, Univ. of Delaware, Agric. Exp. Sta. Newark, Del.

**COSTS AND PRACTICES IN PRODUCING SOYBEANS IN SOUTH CAROLINA** by H. L. Streetman. Bul-

letin 412 Clemson Agricultural College, Clemson, S. C.

**PRESERVATION OF FENCE POSTS WITH WATERSOLUBLE SALTS**, by G. H. Dunkelberg. Copper sulfate, zinc chloride, etc., in treating fence posts, service and variety tests. 47 pages. Bulletin 409 Clemson Agricultural College, Clemson, S. C.

**BIONOMICS OF THE CHERRY FRUIT FLIES IN EASTERN WASHINGTON** by K. E. Frick, H. G. Simkover, and H. S. Telford. 66 pages. Bulletin 13, Washington Agric. Exp. Sta., Pullman, Wash.

## Twig and Blossom Blight

The control of twig and blossom blight is more effective using dithiocarbamate compounds, and least effective using the elemental sulphur compounds, according to Dr. H. T. Hilborn, Maine Agricultural Experiment Sta. Organic mercury compounds and some of the copper compounds are effective in preventing blight but cause some damage to the leaves of the blueberry plants.

For the most effective control of twig and blossom blight, Dr. Hilborn recommends dusting with ferbam during the early stages of blossom bud development. If there is quite a bit of rain during this critical period in the development of the blueberry plant, the dusting should be continued during the blooming period also for best results.

Fertilizer treatments are reported to make some difference, with the possibility that early fertilization may make the plants more susceptible to blight. When fertilizer ratios were compared, a higher percentage of infections was found among plants that had received treatment with fertilizer of a complete ratio.

## Dowfume in Weed Control

Preliminary trials conducted in the spring of 1954 using "Dowfume MC-2" (odorized methyl bromide) as a fumigant for the control of grain and weed seeds contained in mulching straw indicated that Dowfume, used under a gasproof cover, is a useful tool for destroying the germinative ability of seeds contained in the mulching materials. The effectiveness of such a treatment is dependent

upon having sufficient moisture in the seeds to render them susceptible to the MC-2 treatment, thus it is necessary for optimum results, to wet the straw prior to treatment. *Down to Earth*, Fall, 1954.

## "Mouldy Core" in Maine

A disease new to Maine apple orchards, "mouldy core," has made its appearance in the state this season, according to Dr. M. T. Hilborn, plant pathologist of the Maine Agricultural Experiment Station. Red Delicious apples are reported to be particularly susceptible to the disease.

Apple growers in Nova Scotia, Wisconsin and New Zealand, where mouldy core has been prevalent for some time, report that the disease appears in years when unusual weather conditions cause the apples to grow too rapidly during early stages of fruit development. This rapid growth permits the calyx tube to remain open and provides a pathway for the fungi to enter the calyx end of the apple and grow into the core. Mouldy core has been known to western apple raising areas for some years. Apples frequently become infected when they are washed during grading.

The Maine Agricultural Experiment Station reports that there are no known practical control measures to combat mouldy core. Normal spraying practices during the growing season have no positive effect on the spread of the disease. While the fungi causing mouldy core do not usually spread throughout the flesh of the apple, they do pave the way for other fungi that may cause the apples to break down in storage.



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### Formamides Tested

Thirty two N-substituted formamides were tested as insecticides and miticides, using the following species of pests: armyworm, bean weevil, large milkweed bug, pea aphid, citrus red mite, and two-spotted spider mite.

In all the tests N,N-dibutylformamide and N,N-dipentylformamide gave 100 percent kill of three insects and one mite at 5 percent concentration. N,N-Diethylformamide also was effective against three insects, but somewhat less effective as a miticide. Six compounds were effective against two insects and a mite—N-octylformamide, N,N-diethylformamide, N,N-dibenzylformamide, o-chloroformanilide, N-ethylformanilide, and N-isopentylformanilide. N,N-Dipropylformamide and N-heptylformamide gave high kill of two insects. N-tert-Butylformamide, N-hexylformamide, N-phenethylformamide, and N-pentylformanilide were effective against one insect and one mite. USDA. Bulln. ARS-33-1, by S. I. Gertler, A. Yerington.

### Vermiculite Carrier

Vermiculite, a free-flowing inert material has been found suitable for use as a carrier for volatile liquid fumigants to control nematodes. The product has a high sorption capacity for liquids, and releases ethylene dibromide readily for effective root-knot control. It is readily applied as a fertilizer. J. N. Sasser and C. J. Nussbaum, *Plant Disease Reporter* 38, No. 2, 65-67 (1954).

### DDT Residues in Soil

Consequent to the wide use of DDT there has been a growing concern over its possible accumulation in soils in sufficiently large quantities to become harmful to plant growth. Recent investigations indicate that certain plants, especially the shallow rooting and surface feeding crops, are sensitive to DDT.

Studies along this line indicate that DDT residues from sprays and dusts do not appear to penetrate vertically downward below the plow or cultivation depths. In apple orchards most of the DDT was found

in the upper 4 inches of soil, corresponding to the average depth of cultivation. Larger amounts of DDT are found accumulating directly under apple and peach trees than between the rows. In soils from corn and potato crops practically all of the DDT was present at 0 to 9-inch depths, and very little in the lower layers, again conforming to the depth of plowing generally practiced with these crops.

The following table summarizes some of the test data.

Average amounts of DDT recovered in soils from different crops.

	Years treated with DDT	DDT in soils lbs./acre
APPLES		
Under trees	7	62.2
Between trees	7	35.5
PEACHES		
Under trees	6-7	19.0
Between trees	6-7	9.4
POTATOES		
Annual	8	12.2
2-year rotation	3	3.2
CORN	3-6	14.0

J. M. Ginsberg, *N. J. Agriculture* 36, #4, 10-11, 1954.

### Early Tomato Blight

Of the sprays listed below tested for control of early blight in tomatoes, zineb gave outstanding control of defoliation, while effect of other sprays was barely significant. Sprays tested were: .15% zineb, .15% thiram, .17% cupric oxychloride, and 1,1-40 Bordeaux mixture. R. L. Wishart, *J. Agr. S. Australia* 57, 289-94, 1954.

### New Cotton Defoliant

Tumbleaf-ML, new cotton defoliant, has been developed by the agricultural chemicals department of American Potash & Chemical Corp.'s Eston Chemicals Division.

Introduced recently to the market, Tumbleaf-ML is a colorless liquid completely soluble in water, which will not clog equipment or stain cotton. In addition, it contains no boron, a desirable feature in areas in which soil has an oversupply of boron chemicals, the company stated. Tumbleaf, developed 2 years ago by AP&C, contains boron and is suitable for areas with a deficiency of the chemical.

### Vancide 51 Controls Botrytis

A major fungus disease of plants, *Botrytis*, occurring on roses in storage, has been checked by the use of a water-soluble organic sulfur fungicide in experiments conducted by Dr. Saul Rich, plant pathologist at the Connecticut Agricultural Experiment Station.

There are several fungicides which will control *Botrytis* under ideal conditions, but these will not work in rose storehouses. Fungicide manufacturers deliberately make their products insoluble in water, so they will cling to foliage and not wash off in the rain. In the storehouse, there is no rain problem and solubility in water is desired since the chemical must wash down through a stack of roses piled several bushes deep. Fungicide, "Vancide 51" was found to be suitable for this use.

### Toxicity and Antidotal Studies

Anticoagulant properties of Pival and antidotes for Pival poisoning in dogs and secondary Pival toxicity in cats have been investigated. The acute lethal dose of pure Pival following oral administration to dogs was in order of 75 to 100 mg. per kg. Prothrombin and coagulation times, determined prior to Pival administration and daily thereafter, reached maxima of over 540 and 7500 seconds, respectively.

In a subacute study eight dogs were each fed 2.5 mg. of Pival per kg. of body weight. Two untreated dogs served as controls. Pival administration was daily until definite toxic signs or markedly prolonged prothrombin and coagulation times developed. Pival was then withdrawn from two dogs; two were given intravenously 10 mg. per kg. of synthetic vitamin K (Synkavite); two were given intravenously 1.0 mg. per kg. of vitamin K<sub>1</sub> (Mephyton), and two were continued on Pival at 2.5 mg. per kg. until death. Vitamin K<sub>1</sub> was a more effective antidote to Pival poisoning than synthetic vitamin K.

Mice were fed Pival ad lib until death or marked hemorrhagic tendencies were noted, at which time the survivors were sacrificed. All mice were frozen and homogenized with water. Cats were given this whole mouse homogenate in portions equivalent to one 25-gram mouse per cat per day for 15 days. No secondary Pival toxicity was observed. All cats remained healthy during the test period and showed no significant changes in prothrombin and coagulation times.

Abstract of report by J. R. Beauregard, T. W. Tusing, and R. F. Hanzal, Hazleton Laboratories, Falls Church, Va., presented at meeting of the American Chemical Society in New York, Sept. 12-17, 1954.



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AGRICULTURAL CHEMICALS

## INDUSTRY *News*

### ESA to Houston, Dec. 6

The annual meeting of the Entomological Society of America is scheduled for December 6-9 in the Rice Hotel, Houston, Texas. W. R. Horsfall is chairman of the program committee, and A. J. Garon, Jr., heads the committee on local arrangements.

### Conn. Sta. Names Two

Dr. Patrick M. Miller and Dr. Calvin A. Lang have just been appointed to the staff of the Connecticut Agricultural Experiment Station, New Haven, Conn. Dr. Miller has joined the Plant Pathology Department, where he will work on control of fruit diseases, while Dr. Lang will be associated with the Entomology Department, studying the biochemical phases of insect physiology.

### Ohio Pesticide Inst. To Meet

The Ohio Pesticide Institute will hold its 1954 winter meeting, November 17-18, at the Neil House in Columbus. Following the pattern for the 1953 meeting, the program will include a discussion of results obtained in insect and disease control during the past summer, with recommendations for 1955. J. D. Wilson will have charge of arrangements.

### Yoder Heads Department

American Cyanamid last month appointed R. Wayne Yoder manager of the insecticide department of the Agricultural Chemicals Division of American Cyanamid Co. He will be assisted by Thomas J. White.

Mr. Yoder, who was graduated from Pennsylvania State College, where he majored in agronomy, join-



WAYNE YODER

ed Cyanamid in 1945. He rose through the company's agricultural chemical sales force and has been acting manager of the insecticide department since January.

Mr. White formerly was assistant district manager in the Great Lakes district of American Cyanamid. An Iowa State College graduate, he has served in a sales capacity since 1948.

### Leffingwell Names Howe

Leffingwell Chemical Co., Whittier, Calif., manufacturers of oil sprays, insecticides and fungicides for the citrus industry, announced recently the appointment of A. P. Howe as manager of industrial chemicals. Dr. Howe was formerly manager of the chemical products department of Shell Chemical Corp., San Francisco.

### Rockland Chem. To Move

Rockland Chemical Co., Inc., which has been formulating pesticides and medicinal products since 1919 in its Newark, N. J. plant, will double its capacity later this fall when it moves to a new modern plant at nearby West Caldwell.

John R. Wittpenn, vice president and treasurer of the company, said construction of the new plant is scheduled to be completed in November. Capacity at the West Caldwell unit will be approximately 500,000 gallons of products a year, double the present figure, according to Mr. Wittpenn.

The company will continue to supply pesticides to poultry and dairy farmers in the Northeast, particularly in New York, New Jersey, Pennsylvania and Delaware. Products include cattle sprays and lindane mixtures for controlling lice and mites on poultry.

The new plant will be 120 feet by 50 feet, of colonial style. It will employ seven workers, with 11 salesmen marketing the products.

### Fertilizer Safety Meetings

The fertilizer safety section of the South Carolina Annual Accident-Prevention Conference will meet November 19, at the Hotel Cleveland, Spartanburg, S.C. T. J. Clarke is program chairman.

The Executive Committee of the Fertilizer Section, National Safety Council will meet December 7th, at the offices of Spencer Chemical Co., in Memphis, Tenn.

## NFA Fall Meeting in Florida, November 10-12



O. V. WELLS



R. BRADFIELD

**O**UTLOOK for farm prices and problems of agronomy will be featured at the fall meeting of the National Fertilizer Association in the Hollywood Beach Hotel, Hollywood, Fla., Nov. 10-12.

Discussing farm prices at the meeting will be Oris V. Wells, administrator, Agricultural Marketing Service, USDA. Dr. Richard Bradfield, head of the Department of Agronomy, Cornell University, will be the speaker on organic residues in the soil and how to manage them.

Mr. Wells, one of the country's leading agricultural economists, is noted for his ability to interpret economic situations as they relate to national farm programs, the NFA stated. He has been with the Department of Agriculture for 25 years, most of which time was spent with the former Bureau of Agricultural Economics, a predecessor of the Agricultural Marketing Service. He was chief of the BAE from 1946 until being appointed AMS administrator in 1953. As AMS administrator, he is responsible for distribution and marketing programs of the department and for coordination of all the department's statistical work.

Dr. Bradfield is recognized as an authority in the fields of agronomy and soil science. He has been professor of soil technology and head of the department of agronomy at Cornell since 1937. From 1920 to 1930 he was at the University of Missouri, where he was in charge of research and teaching of physical chemistry of soils and colloid chemistry in the Soils Department. He was professor of soils at Ohio State University and associate in agronomy at the Ohio Agricultural Experiment Station from 1930 to 1937. He is the author of

numerous papers on soils and fertilizer.

The National Fertilizer Association's fall meeting will bring together an estimated 500 representatives of fertilizer manufacturers and associated industries. Additional program details will be announced at a later date.

The NFA staff announced last month that the association will not hold its 1955 fall convention, following a decision by the board of directors in June. Further discussion of the matter is scheduled for the board meeting in Hollywood, Fla., with the door left open for another membership opinion survey on whether a by-law change should be recommended to the membership.

NFA emphasized that the board action affects only the 1955 fall meeting. Any permanent change would require a change in the by-laws.

### Calspray Names Vasak

Appointment of Otto Vasak to the position of Research Engineer at California Spray-Chemical Corp.'s Richmond, Calif., plant, was announced this week by L. R. Gardner, manager of Research and Development.

Vasak, who was formerly a staff engineer at the Richmond plant, now will be in charge of the main pilot plant engineering for manufacture of Orthocide (Captan). He joined Calspray in 1951.

### New Mid-West NH<sub>3</sub> Plant

Standard Oil Co. (Indiana) and Sinclair Refining Co. last month announced joint plans for a new ammonia plant to be built in Hammond, Indiana. The plant will have a capacity of 300 tons per day of anhydrous ammonia, which will make it the largest in the country, producing anhydrous ammonia from by-product hydrogen. It will also produce solutions of ammonia and ammonium nitrate.

A new company will be formed to own the plant. Standard, which will supervise construction and later

operate the plant, under contract with the new company, is obtaining bids from contractors. Site preparation is planned to start late this fall, with the beginning of construction tentatively planned for next spring. Completion of construction and initial operation is scheduled for early in 1956. Products of the plant will be marketed chiefly in the midwest area. Standard and Sinclair will each market their portion of the products separately. Shipments out of the plant will be made by tank truck and tank car.

### New Sales Mgr. for Miss. River

John L. Sanders last month was appointed sales manager of the Chemical Division of Mississippi River Fuel Corp., St. Louis, Missouri. Mr. Sanders will handle the sale and distribution of their ammonium nitrate, anhydrous ammonia, and nitrogen solutions for the newly formed division, to be known as Mississippi River Chemical Company. Production from their new ammonia plant at Selma, Missouri is expected in the fall of 1955.

### Phosphate Assn. Formed

The American Superphosphate Institute, a trade organization of manufacturers of superphosphate was formed recently and established offices at 1028 Connecticut Ave., Washington, D. C. H. W. Doerr is president and treasurer of the association. F. R. Dulany, president of Southern States Phosphate & Fertilizer Co., is vice president of the institute; and the secretary is C. Ellis Jr., president of Mutual Fertilizer Co.

### Fertilizer Safety Meeting

An executive committee meeting of the Fertilizer Section, National Safety Council, has been scheduled by the group for Oct. 17 at 8 p.m. in the LaSalle Hotel, Chicago.

The meeting, at which committee reports will be given and discussed, will be a prelude to the regular sessions of the Fertilizer Section in Chicago, according to Vernon S. Gornto, general chairman of the Section.

## AGRICULTURAL CHEMICALS

### Control Officials to Washington

Each year the officials charged with regulating the labeling of fertilizers and pesticides have a flock of new problems brought about by the introduction of new materials and new methods of marketing. This year is expected to be no exception, as the official associations of the control officials gather at the Shoreham Hotel, Washington, D. C., to discuss their problems and hear reports of committees dealing with special materials and problems.

Four meetings are scheduled for successive days starting Oct. 11, with the final two, the Association of American Fertilizer Control Officials and the Association of Economic Poisons Control Officials, having particular interest for members of the agricultural chemicals industry. These two groups are scheduled to hear legal talks by John D. Conner and Dr. M. R. Clarkson, respectively, in addition to the regular reports. Mr. Conner is attorney for the National Agricultural Chemicals Association, while Dr. Clarkson is deputy administrator of the Agricultural Research Service, USDA.

The Association of Official Agricultural Chemists, Inc., parent group, will open the series of meetings Oct. 11-13. Convening next will be the Association of American Feed Control Officials, Oct. 13 and 14, followed by the fertilizer and pesticide officials, Oct. 15 and 16, respectively.

Other speakers scheduled for the AAFCO include Henry A. Davis, New Hampshire, president of the organization; Dr. Russell Coleman, president of the National Fertilizer Association; Paul T. Truitt, president of the American Plant Food Council; Rodney C. Berry, state chemist, Virginia; Walter Scholl and Hilda M. Wallace, USDA; and Dr. W. L. Nelson, North Carolina State College.

Floyd Roberts, North Dakota, president of AEPCO, is listed as a speaker before that group, in addition to Dr. Philip J. Spear, technical director of the National Pest Control Operators Association.

The NFA will honor the fertilizer officials with a banquet Oct. 14

while the APFC will be host at a dinner for the group the next evening. All meetings will be held in the Shoreham.

### General Chem. Names Damon



General Chemical Division, Allied Chemical & Dye Corp., has named John L. Damon manager of sales of agricultural chemicals. Mr. Damon has been with General Chemical since 1936, and has been manager of sales for the complete line of Baker & Adamson laboratory reagents and fine chemicals. He is a graduate chemical engineer of Rensselaer.

### Congo Firm Wants Chemicals

The Institut National Pour L'Etude Agronomique du Congo Belge, B.P. 83, Kaniama, Belgian Congo, expresses an interest in complete information on pest control materials for use on tobacco, potatoes, citrus, coffee trees and vegetables. They are particularly interested in new soil fumigants, fungicides, rodenticides, plant nutrients, and hormone products to control sprouting of tubers.

### CFA to Hear Wilcox, Truitt, Allstetter

THE thirty-first annual convention of the California Fertilizer Association will be held on November 15 and 16, 1954, at the del Coronado Hotel, Coronado, California. B. H. Jones of Fresno, association president, announced September 27th.

Outstanding speakers will emphasize the important position of the commercial fertilizer industry in the agricultural picture. Among them will be Francis R. Wilcox, Sunkist Growers, Los Angeles; Paul T. Truitt, president, American Plant Food Council, Inc., Washington, D. C.; W. R. Allstetter, vice president, National Fertilizer Association, Washington, D. C.; Jesse W. Tapp, Bank of America, Los Angeles; Allen B. Lemmon, California Bureau of Chemistry; and M. E. McCollam, Western States Manager, American Potash In-

### Fairfield Appointments

Appointments to administrative sales posts in the headquarters office of the Fairfield Chemical Division of Food Machinery and Chemical Corporation, in New York, have been announced by John A. Rodda, sales manager of the new division.

All of the appointments made by Mr. Rodda are personnel retained from the insecticide division of U. S. Industrial Chemicals Co., Division of National Distillers Products Corp., which was purchased by Food Machinery, and became the Fairfield Chemical Division of the latter company effective September 1. (*Agricultural Chemicals*, p. 102, September, 1954.)

William S. Wallace, for many years an employee of U. S. Industrial Chemicals has been named office assistant to Mr. Rodda in the sales department. George Kerbey, who had long experience in the farm chemicals field prior to his association with USI five years ago, becomes Mr. Rodda's assistant in field sales operations.

The third appointment is that of John F. Odeneal, who will be in charge of sales in the New York area. Mr. Odeneal was in charge of insecticide sales of the New York area office of USI.

stitute, Inc., and also chairman of the Association's Soil Improvement Committee.

Three directors will be elected at the Membership Business Meeting, to serve during the next three years.

Tuesday, November 16, will be devoted to recreation. Scheduled are golf tournaments for men and for women, a ladies putting contest, bowling, and bridge tournaments. Cocktail parties will be sponsored by Balfour, Guthrie & Co., Limited, and the American Potash & Chemical Corporation.

A steak dinner will be served through the courtesy of Shell Chemical Corporation, Nitrogen Division of Allied Chemical & Dye Corporation, and Producers Sales Company. The program will conclude with the annual banquet.

## PHILLIPS OFFERS



## FERTILIZER MATERIALS FOR HIGH ANALYSIS MIXTURES

### 1 AMMONIUM SULFATE



New Premium Quality Phillips 66 Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is dry-cured to remove excess moisture—prevent caking. Uniform, dust-free crystals flow freely—mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

### 2 ANHYDROUS AMMONIA



Phillips 66 Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Adams Terminal near Houston, Texas.

### 3 NITROGEN SOLUTIONS



Get more N per dollar! There are three Phillips 66 Nitrogen Solutions for use in preparation of

high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep handling costs low, help rapid, thorough curing.

### 4 AMMONIUM NITRATE



Phillips 66 Prilled Ammonium Nitrate contains 33% nitrogen. The small, coated prills or pellets resist caking . . . handle easily. Depend on Phillips 66 Prilled Ammonium Nitrate for uniform, free-flowing properties in formulations and top-notch crop response as a direct application material.

### 5 TRIPLE SUPERPHOSPHATE



Phillips 66 Triple Superphosphate contains 46% available phosphoric acid. Uniform, free-flowing material . . . ideal for use in formulation of high analysis fertilizers and for direct application. Available in bags or bulk.

## PHILLIPS CHEMICAL COMPANY

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DENVER, COLO.—1375 Kearney Ave.  
DES MOINES, IOWA—606 Hubbell Bldg.  
HOUSTON, TEX.—1020 E. Holcombe Blvd.

INDIANAPOLIS, IND.—1112 N. Pennsylvania St.  
KANSAS CITY, MO.—500 West 39th St.  
MINNEAPOLIS, MINN.—212 Sixth St. South  
NEW YORK, N. Y.—80 Broadway  
OMAHA, NEB.—WOW Building  
PASADENA, CALIF.—604 Citizens Bank Bldg.

SALT LAKE CITY, UTAH—68 South Main  
SPOKANE, WASH.—521 E. Sprague Ave.  
ST. LOUIS, MO.—4251 Lindell Blvd.  
TAMPA, FLA.—1214 South Dale Mabry  
TULSA, OKLA.—1708 Ullico Square  
WICHITA, KAN.—501 KFH Building



## APFC Sponsors Tour

Field trips to land-grant colleges and experiment stations were a major feature of the American Plant Food Council's agricultural research tour conducted during the late summer for seventeen of the nation's best-known editors of farm magazines. A typical scene on the tour (above) shows the editors viewing copper deficiency in plants on muck



soils at one of the University of Wisconsin's experiment stations. Dr. Kermit C. Berger, Professor of Soils, Department of Soils, University of Wisconsin, is shown at the extreme right.

The American Plant Food Council and its guests visited the University of Wisconsin, Madison, Wisc.; Delta Branch

Experiment Station, Stoneville, Miss.; the North Carolina State College, Raleigh, N. C.; and Rutgers University, New Brunswick, N. J. Lectures and reports on the latest developments and progress in the field of agricultural research and sound land management were presented at all four land-grant colleges.

## Nicaragua Ups Pesticide Use

Nicaragua is expected to increase its pesticide consumption by 50 per cent in 1954-55 season, according to a recent report by the U. S. Bureau of Foreign Commerce.

Estimated 1954-55 consumption is as follows:—BHC (14 per cent), 404,500 pounds; DDT (100 per cent), 340,000 pounds; DDT (75 per cent wettable), 250,000 pounds; toxaphene, 160,000 pounds; aldrin (60 per cent), 8,000 pounds; dieldrin (100 per cent), 5,300 pounds; parathion (25 per cent) 2,500 pounds; sulfur, 120,000 pounds; 2,4-D, 1,800 gallons.

## IMCC Names Six

A series of new appointments within International Minerals & Chemical Corporation's Plant Food Division were announced early last month. Fred J. Jilek, formerly administrative assistant to the division's general manager, has been named assistant to the operating manager, John D. Zigler. Roger L. Hugg, formerly labor relations supervisor, has been advanced to the position of personnel supervisor for the division. W. Robert McDaniel, formerly production materials supervisor, has been promoted to materials supervisor.

Donald B. Johnson, Jr., has been appointed market analyst in the Plant Food Division's sales depart-

ment. Jack W. Hicks becomes manager for area III, operating from International's installation at Mason City, Iowa; and John M. Coates, formerly sales representative in the Mason City district, succeeds Mr. Hicks as district sales manager.

## Okla. Assoc. Plans Contest

The Oklahoma Plant Food Association announced recently a new contest sponsored by the Association, designed to encourage more extensive use of fertilizers and plant nutrients. The Wheat Improvement Contest for the year 1954-55 is open to any 4-H club member, regularly enrolled in the small grain project. Further details are available from the Association at Box 3153, Oklahoma City, Okla.

The Oklahoma Association holds meetings quarterly, and is planning two dealer meetings for this fall, in which members of industry and extension personnel will discuss with dealers, bankers and farmers questions concerning soil improvement and fertility.

## Cotton States ESA Conf.

The annual meeting for the Cotton States branch of the Entomological Society of America will be held at the Tampa Terrace Hotel, Tampa, Fla., January 17-19, 1955.

## New T-H Warehouse

Thompson-Hayward Chemical Co., Kansas City, recently completed plans to expand storage facilities and build a new warehouse adjoining present manufacturing facilities at the company's new plant in Kansas City, Kans. Construction will be completed by early December.

## Deere Appoints Greeff Rep.

Grand River Chemical Division of Deere & Co., Tulsa, Okla., has appointed R. W. Greeff & Co., New York, as its exclusive sales agent to handle the distribution of technical grade urea for chemical and industrial use. The \$20 million nitrogen plant of Deere & Co. is nearing completion in Pryor, Okla., and production of fertilizer grade urea is expected this month. Rated daily capacity of the plant is 180 tons.

## Pacific Coast Names Fisher

T. R. Fisher has been appointed as an agronomist with the Plant Food Division of the Pacific Coast Borax Co. Mr. Fisher in the past has been with the Missouri Conservation Commission and worked recently as an agronomist in the Midwest. In his present position, Mr. Fisher will be responsible for agronomic research work and sales development in the Midwest. His present headquarters are at Columbia, Mo. E. M. Kitchen, who formerly was connected with the Plant Food Division of the Pacific Coast Borax Co. in the Eastern area and who is a recognized authority on boron deficiency problems, has been transferred to the company's Industrial Division with headquarters at Los Angeles.

## Bradley Opens 2 New Offices

Two new offices to serve eight southern states have been announced by Bradley & Baker, New York, distributors of basic fertilizers. The two offices include one in Atlanta, which was opened for business on August 1, and is headed by Richard R. Mehrhof. The second office is located in Norfolk and is under the management of Clarence J. Ball. Operations started there about September 1st.

# Better than ever

## **ORTHO LINDANE** more than meets government standards

ORTHO Lindane 100 is actually purer than the minimum government standards — has a minimum gamma isomer of 100% . . . highest potency . . . combines effectiveness with economy.

### **Easy to formulate**

ORTHO Lindane is easy to handle and formulate as a spray or dust. The crystals are dry and free-

flowing, easily ground to micro-size.

ORTHO Lindane may be purchased in prepared formulations under the ORTHO brand name of ISOTOX. A variety of ISOTOX formulations in liquid, wettable and concentrate form is available.

*Call your nearest ORTHO sales office for full details and free explanatory literature.*

### **CALIFORNIA SPRAY-CHEMICAL Corp.**

Portland, Ore.	Sacramento, Calif.	Orlando, Fla.	Linden, N.J.
Whittier, Calif.	Caldwell, Idaho	Phoenix, Ariz.	Medina, N.Y.
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On all chemicals, read directions and cautions before use.

T.M.'S REG. U.S. PAT. OFF. ORTHO, ISOTOX



**AGRICULTURAL CHEMICALS**

### Powell Moves Export Office

Export facilities of John Powell & Co., New York, were moved early in September from One Park Avenue to 745 Fifth Avenue, New York, the headquarters office of the Squibb-Mathieson Overseas Division of Mathieson Chemical Corp. Personnel remains the same, with C. J. Fredrickson as manager, and A. E. Collazo, export sales manager. The move involves John Powell Export Corp. and the Overseas Division of John Powell & Co., consolidating in one office all the overseas sales activities of the two Powell and the Squibb-Mathieson Overseas Divisions.

### Knowles Joins Arkell & Smiths

Harry V. Knowles has been appointed assistant to the sales manager, Ernest H. Heath, Jr., of the Flexible Packaging Division, Arkell & Smiths, New York. Mr. Knowles was formerly associated with the packaging sales division of the Dobeckman Co. and, after that, with Shellmar Products Corp.

### Olin Mathieson Officers

Election of the following officers of Olin Mathieson Chemical Corp., formed August 31 by the merger of Olin Industries, Inc., and Mathieson Chemical Corp., was announced early last month by John M. Olin, chairman of the board, and Thomas S. Nichols, president.

John W. Hanes, chairman of the finance committee and vice president for finance; F. Stillman Elfred, John C. Leppart, Stanley de J. Osborne, executive vice presidents; Russell R. Casteel, vice president; Norman H. Collisson, vice president for operations; Donald W. Drummond, vice president for operations; R. L. Hockley, vice president for operations; Russell Hopkinson, vice president for development; Robert W. Lea, vice president for organization; R. B. Lewis, vice president for financial analysis; David T. Marvel, vice president for sales; Milton F. Meissner, vice president for operations; S. L. Nevins, vice president for operations; Walter F. O'Connell, vice president and assistant to the vice president for

finance; Fred Olsen, vice president for research, Ralph A. Ostberg, vice president for production; J. J. Toohy, vice president for operations; Theodore Weicker, Jr., vice president for overseas operations; Edgar W. Taft, treasurer; C. C. Tallman, controller; Gordon Grand, Jr., secretary; E. R. Van Vliet, assistant treasurer; A. P. Winsor, assistant secretary.

The officers elected were all formerly associated with one or the other of the predecessor companies.

### Soil Committee Names Trunkey

Charles E. Trunkey has been named assistant secretary of the Middle West Soil Improvement Committee. He is a graduate of Iowa State College, where he specialized in agronomy. He will assist in field work and in gathering and processing editorial and pictorial materials in connection with the educational program sponsored by the Middle West Soil Improvement Committee.

## Meeting Calendar

Oct. 6-7—Fifth Annual Convention, Pacific Northwest Plant Food Association, Sun Valley, Ida.

Oct. 11-13 — Association of Official Agricultural Chemists, Inc., Shoreham Hotel, Washington, D. C.

Oct. 12-15—8th National Chemical Exposition, Chicago Coliseum.

Oct. 13-14—Association of American Feed Control Officials, Shoreham, Washington, D. C.

Oct. 14-15—Society of Agricultural Engineers, Pacific Northwest Section, Davenport Hotel, Spokane.

Oct. 15—Association of American Fertilizer Control Officials, Shoreham Hotel, Washington, D. C.

Oct. 16 — Association of Economic Poison Control Officials, Shoreham Hotel, Washington, D. C.

Oct. 18-19—Fertilizer Section, NSC, Chicago, Ill.

Oct. 18-21—National Pest Control Association, annual convention, Hotel Di Lido, Miami Beach.

Oct. 20-22 — 61st Annual Meeting, Farm Equipment Institute, Edgewater Beach Hotel, Chicago.

Oct. 26-27 — Annual Washington State College Dusting and Spraying Conference, Chinook Hotel, Yakima, Wash.

Oct. 28-29 — Canadian Agricultural Chemicals Assoc., annual meeting, Seignior Club, Montebello, Quebec.

Nov. 3-4—South Carolina Annual Fertilizer Meeting, Clemson College, Clemson, S.C.

Nov. 8-12—American Society of Agronomy, St. Paul Hotel, St. Paul, Minn.

Nov. 9-11—16th Annual New York State Insecticide-Fungicide Conference, Ithaca, N. Y.

Nov. 10-12—National Fertilizer Assoc., Hollywood Beach Hotel, Hollywood, Fla.

Nov. 15-16—Eastern Branch, E.S.A., Hotel New Yorker, New York City.

Nov. 15-16—California Fertilizer Association, del Coronado Hotel, Coronado, Cal.

Nov. 17-18 — Ohio Pesticide Institute, Neil House, Columbus, O.

Nov. 18-19—South Carolina Accident Prevention Conference, Fertilizer Section, Spartansburg, S. C.

Nov. 19 — Fertilizer Section Safety Meeting, S. C. Accident Prevention Conference, Hotel Cleveland, Spartanburg, S. C.

Nov. 29-30—Indiana Fertilizer Conference, Memorial Union Building, Purdue University, Lafayette, Ind.

Dec. 2-3 — Beltwide Cotton Insect Control Conference, Adolphus Hotel, Dallas, Tex.

Dec. 5-8—Agricultural Ammonia Institute, Jung Hotel, New Orleans.

Dec. 6-9—Entomological Society of America, annual meeting, Houston, Tex.

Dec. 6-9 — North Central Weed Conference, Gardner Hotel, Fargo, N. D.

Dec. 7 — Executive Committee Meeting, Fertilizer Section, at Spencer Chemical Co., Memphis, Tenn.

Jan. 4-5, 1955 — Pesticide School, North Carolina State College, Raleigh.

Jan. 9-12, 1955—Middle States Garden Supply Show, Hotel Sherman, Chicago.

Jan. 17-19, 1955 — Cotton States Branch, E.S.A., Tampa Terrace Hotel, Tampa, Fla.

Jan. 31-Feb. 3, 1955—Eastern States Garden Supply Show, 71st Infantry Regiment Armory, New York.

March 7-9, 1955 — National Agricultural Chemicals Assoc., Spring Meeting, Chase & Park Plaza Hotel, St. Louis, Mo.

# V-C Experience Means Better Bags for You



Experienced inspectors watch every phase of V-C's bag-making operation. Shown above is inspection of pasted bags. Photo at right shows battery of sewing machines, and inspection of completed sewn bags on conveyor belt.



Experienced operators carefully apply sleeves in the manufacture of sewn-valve bags. Great care is necessary in this operation. An improperly inserted or aligned sleeve can cause sifting after the bag is filled.

**DEPEND ON V-C's** more than 50 years of bag-making experience to help solve your packaging problems. Long experience, manufacturing skill and top-grade materials, add up to better-built V-C Multiwall Bags that provide maximum protection for your product. V-C Multiwall Bags are designed to your needs, made two- to six-ply, and printed in one to four colors. Write for full information, or discuss your requirements with a V-C representative.



MADE AS CAREFULLY  
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BEST TAILORED SUIT.



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### Price Cuts Drop V-C Net

A drop in fertilizer prices in certain large and important areas resulted in a drop in Virginia-Carolina Chemical Corp.'s earnings in its fiscal year 1954. Joseph A. Howell, president, reported recently.

For the year ended June 30, Virginia-Carolina reported sales of \$85,445,975, compared with \$82,126,077 the previous year. Earnings for the latest year were \$3,618,198 equal to \$16.98 a share, compared to \$4,215,874 equal to \$19.79 a share in fiscal 1953.

Other departments of the company were on a satisfactory basis, Mr. Howell said. A new superphosphate plant, new chemical plant and improved mining facilities should contribute materially to earnings in the current fiscal year, he noted.

### Harry F. Dietz Dies

Dr. Harry F. Dietz, nationally known authority on control of insects, weeds, and plant diseases, died Saturday, September 4, of a heart attack at his home in Chadds Ford, Pa. He was 64 years old.

Dr. Dietz had been employed by the Du Pont Company's Grasselli Chemicals Department since 1932, and since 1949 had been manager of the agricultural chemicals section of Grasselli's technical division. Before joining the Du Pont Company, Dr. Dietz had worked on agricultural pest control for twenty years with state and federal agencies.

Dr. Dietz was the author of many works on entomology. His publications include studies of scale insects and termites of Indiana, black fly of citrus, termites of Panama and the Canal Zone; insects and diseases of greenhouse and ornamental plants; and apple, peach, and vegetable insects.

### New Lab for General Chemical

Allied Chemical & Dye Corp., last month dedicated a large new research laboratory for its General Chemical Division in Morris Township, N.J. The two-million dollar structure consists of a three-story, L-shaped building, including more than 30 laboratories of various types, a

technical library, engineering research offices, agricultural formulating and milling laboratory, etc. The new facilities replace the Division's Laurel Hill, Long Island, N.Y., laboratory. Dr. J. H. Pearson is director of the center.

### Canada Fert. Sales Down

Production of fertilizer by North American Cyanamid, Ltd., Niagara Falls, Ont., was reduced considerably last month. A company spokesman indicated the cut was made necessary by a decrease in fertilizer sales. D. M. Collette, plant manager, said it was "impossible to predict at this time when production would be increased.

### NYS Conf. Nov. 9-11

The 1954 fall meeting of the New York State Insecticide, Fungicide and Application Equipment Conference is scheduled for November 9-11, at Cornell University, Ithaca, N.Y. Equipment problems will be discussed the first day, and research and recommendations of insecticides and fungicides for New York State will be reviewed in the succeeding two days.

O. C. French, agricultural engineering; G. C. Kent and J. M. Hamilton, plant pathology; and C. E. Palm and P. J. Chapman, entomology, make up the committee on arrangements and program.



## It pays to pamper crops!

The farmer appreciates the value of scientific pest control, for he can thus raise more crops per acre and yield a greater profit. And progressive formulators, too, realize this growing market demands better chemicals to produce effective herbicides. For these, as well as for insecticides, Neville makes two grades of Solvents that are proving highly popular in this field.

NEVILLE AROMATIC SOLVENTS		
	NEVSOLV 200	NEVSOLV 30
Boiling Range	195°C (383°F) to 280°C (536°F)	130°C (266°F) to 190°C (374°F)
Specific Gravity	.890 to .915	.835 to .845
Color	Straw	Water White

● These NEVSOLVS are active solvents for DDT, BHC, 2-4-D esters, etc. Especially clean, good odor.

Each grade has individual characteristics but other boiling ranges are available.

**NEVILLE CHEMICAL CO.**  
PITTSBURGH 25, PA.

**NEVILLE**

Plants at Neville Island, Pa., and Anaheim, Cal.

AC-2

### Highway Names Ford

The Highway Equipment Co., Inc., Cedar Rapids, Iowa, recently announced the appointment of George E. Ford of Decatur, Georgia, as southeastern district manager. Mr. Ford will serve dealers in the states of Florida, Georgia, South Carolina, North Carolina, Tennessee, Alabama and Mississippi. He will make his headquarters in Decatur.

The Highway Equipment Co. manufactures a complete line of spreaders for lime and fertilizer; self unloading bulk transports and bulk feed bodies.



### FOA Awards Fertilizer Funds

The Foreign Operations Administration last month made an initial allotment of \$45,000,000 to Korea to finance imports of fertilizer, raw cotton, and miscellaneous raw materials.

### Barnard Heads Fertilizer Group

J. D. Barnard, Green Giant Co., last month was elected general chairman of the National Joint Committee on Fertilizer Application. He was named to the post for the coming year at a meeting in Gainesville, Fla., Sept. 6, held in cooperation with the American Society for Horticultural Science.

Other officers include D. G. Aldrich, Jr., associate chemist, University of California, vice chairman; and M. H. McVickar, The National Fertilizer Association, secretary.

The group heard a series of papers on improved fertilizer application for more efficient use of plant foods. The papers will be printed in the proceedings of the meeting and will be distributed by NFA to interested persons.

### Davidson Addresses CCDA

Systematic development of new products by American industry promises to be a major force in extending our scientific frontiers and further raising our standard of living. Dr. Joseph G. Davidson, chairman of Carbide and Carbon Chemicals Co., said recently.

He spoke at a dinner meeting of the Commercial Chemical De-

velopment Association, which opened the 126th National Meeting of the American Chemical Society, in New York Sept. 12.

### Stauffer, Dow Honored

Stauffer Chemical Co. and the Dow Chemical Co. were honored in September in the "Best Places to Work" competition sponsored by "Management Methods" magazine. The competition was designed to demonstrate "how well-planned, well-integrated quarters improve both employee and executive productivity and morale."

Stauffer was lauded for ingenious use of glass walls to make effective use of windowless space, while Dow was praised for "Best 'Special Situation' Solution."

### Bridgers Discusses Company

The large scale growth of Farmers Cotton Oil Co., of North Carolina, was outlined last month by its president, Thomas F. Bridgers. Speaking at a stockholders luncheon in Wilson, N.C., Mr. Bridgers said the company, which also operates plants at Lillington, N.C., and Norfolk, Va., has grown from a \$14,200 firm in 1902 to a corporation which today has assets of more than \$1,781,777.

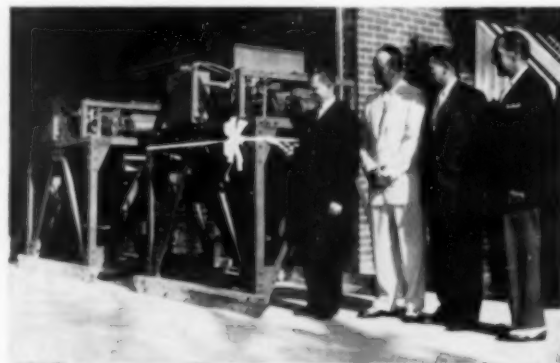
He added that dividends issued from 1934 to 1954 totaled \$649,670.

### I.C.C. Opens Ga. Plant

A group of Union Bag & Paper Corp. executives attended the formal opening of the Inglett & Corley Inc. plant at Augusta, Georgia recently. This new 9600 square foot factory increases production capacity of the I & C bagger, an automatic weighing and bag filling machine used for high speed packaging of fertilizer and other free flowing materials. Shown cutting the ribbon on the first bagging machine off the new plant's production line is company president W. L. Inglett.

Onlookers are C. M. Inglett, secretary-treasurer; W. F. Jacobi, packaging machinery manager of Union Bag & Paper Corp. and S. K. Bradley, vice president in charge of multi-wall bag sales of

Union Bag & Paper Corp. Union Bag & Paper Corp. is exclusive sales agent for the Inglett & Corley automatic weighing and bag filling machine.



### Israel Fertilizer Output Up

The output of the Fertilizers and Chemicals Ltd. plant in Haifa has expanded rapidly during the past few months. A record production of 7,700 tons of superphosphate was achieved in June and the production of sulphuric acid now exceeds 3,450 tons monthly. Superphosphate production was 17,500 tons during the second quarter of 1954 as compared with 5,100 tons in the corresponding quarter of 1953. The company is building a rock phosphate calcination plant near the phosphate mines in the Negev.

### Pest Control Assn. to Fla.

The National Pest Control Association has scheduled its 21st annual meeting for October 18-21 at the De Lido Hotel, Miami Beach. Reports to be presented at the meeting will concern insecticide resistance, insect control in food plants, weed control and fumigation dosages, and soil treatment for control of termites.

### Bemis Opens Two New Plants

Two new paper specialty plants for Bemis Bro. Bag Co. have been completed and went into operation last month. One of the new plants is located at Crossett, Ark., and the other at Albion, New York. Both plants are equipped to manufacture paper covers and liners for packaging articles of odd shapes and sizes.

### Bagpak Appoints Worthington



who retired after 50 years of service.

Ross R. Worthington has been appointed sales manager of the Bagpak Division of International Paper Co., A. A. Scholl, division manager, announced last month. He succeeds Roy I. LaMarche,

### New Am Potash Laboratory

A new \$150,000 dust-proof and air-conditioned control laboratory has been completed and put into operation at American Potash & Chemical Corp.'s main plant at Trona.

The two-story structure is an all-metal windowless building incorporating the latest safety and convenience devices for use in the testing of chemicals.

### St. Regis' Sales Mgrs.

St. Regis Paper Co. announced the appointment of H. A. Hughes, vice president of St. Regis Sales Corp., its sales subsidiary, as assistant general sales manager of the Multiwall Packaging Division. H. C. Peterson, Jr., vice president of St. Regis Sales Corp., was appointed as eastern district sales manager of the Multiwall Packaging Division.

### Aramite for Poultry Mites

Aramite, produced by the Nautagatuck Chemical Division, U. S. Rubber Co., New York, was recently approved for sale and use on poultry mites. Tests show the chemical to be nontoxic to poultry, and effective in mite control.

### Standards Symposium Nov. 16

Standards for agriculture and horticulture will be the topic of a symposium to be held Nov. 16, at the Hotel Roosevelt in New York City as part of the Fifth National Conference on Standards, sponsored by the American Standards Association.

H. H. Haller, Assistant Director of Crops Research of the U. S. Department of Agriculture will describe the work under way to develop national standards for common names of pesticides. Dr. Haller is chairman

of ASA Sectional Committee K62 on Pest Control Chemicals. The Committee deals with standardizing names for chemicals used as insecticides, fungicides, rodenticides, herbicides, nematocides, defoliants, and plant growth regulators. J. E. Archer, American Cyanamid Co., will describe similar work under way in other countries.

Other speakers at the Symposium on Standards for Agriculture will discuss existing and future programs for seed standards.

### Raymond Names Raleigh, Pyle

The Raymond Bag Co., Middletown, Ohio, has announced the appointment of two new members to their Chicago District Office sales organization. W. Ray Raleigh, with over 14 years' experience in the industrial packaging field, will handle sales for a portion of Chicago and the remainder of the State of Illinois. E. H. Pyle, who has been engaged in multiwall paper sack sales for 25 years, will also represent Raymond in a portion of Chicago and Wisconsin.

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## Potash Deliveries Up 3%

Potash deliveries in North America for the first time passed the two million mark, a total of 2,006,364 tons  $K_2O$  during the fiscal year of June 1953 through May 1954, according to a report by the American Potash Institute last month. This represents an increase of 3% over 1952-1953. Deliveries by the seven leading American potash producers were well over any previous year, but those of imported potash were lower than last year. Deliveries for agricultural purposes in the Continental United States amounted to 1,791,474 tons  $K_2O$ , an increase of more than 3% over last year.

Illinois was the leading state for deliveries, followed in order by Ohio, Indiana, Georgia, and Virginia. Deliveries do not necessarily correspond to consumption in a given state. Muriate of potash was the principal grade, comprising 93% of the total agricultural potash delivered; sulphate of potash and sulphate of potash-magnesia together made up nearly 7% of deliveries; while manure salts dropped to an insignificant figure, reflecting the trend toward the use of more concentrated materials.

## Deliveries of Potash Salts June 1953 Thru May 1954 in tons of 2,000 lbs. $K_2O$ .

Point of Delivery	Muriate— 60% & 50%	Manure Salts	Sulphates	Total
Total U. S.	1,672,082.05	1,349.25	118,042.28	1,791,473.58
Canada	65,731.29	—	6,616.35	72,347.64
(Imports)	(28,658.80)	—	(1,758.50)	(30,417.30)
Cuba	4,275.49	—	2,393.40	6,668.89
(Imports)	(1,406.00)	—	(1,451.90)	(2,857.90)
Hawaii	17,199.00	—	1,652.50	18,851.50
Puerto Rico	18,769.04	—	2,084.25	20,853.29
(Imports)	(3,812.59)	—	(901.50)	(4,714.09)
Total Institute Territories	1,778,056.87	1,349.25	130,788.78	1,910,194.90
Exports	3,498.46	—	183.00	3,681.46
Grand Total	1,781,555.33	1,349.25	130,971.78	1,913,876.36
(Imports)	(120,457.14)	—	(27,882.48)	(148,339.57)

(Note: Figures in parentheses represent imports and are included in the totals immediately above them.)

## South Carolina Fertilizer Conference

The annual fertilizer conference in Clemson, South Carolina set for November 3-4, 1954, will include several reports and discussions on the efficient use of fertilizer, fertilizer-pesticide mixtures, plant nutrients, etc. H. J. Webb, will preside at the first day's session, while Dr. O. B. Garrison will preside on the final day. The complete program is as follows:

### November 3, Wednesday

Greetings, Dr. E. F. Poole, president Clemson Agricultural College.

Remarks, Dr. M.D. Farrar, Dean of Agriculture, Clemson, S. C.

"Improving our Fertility Program," J. M. Davis, Epting Distributing Co., Leesville, S. C.

"Soil Testing in South Carolina," Dr. H. G. Allbritten, S. C. Experiment Station, Clemson, S. C.

"Nitrogen (Solid, Liquid and Gas) for Direct Application," Dr. E. R. Collins, North Carolina State College, Raleigh, N. C.

"More Efficient Use of Fertilizer," Dr. J. Fielding Reed, American Potash Institute, Inc., Atlanta, Ga.  
 "Pasture Grazing Results," Dr. W. A. King, S. C. Experiment Station, Clemson, S. C.  
 "Livestock Sanitary Work," Dr. R. W. Carter, Director Livestock Sanitary Department, Columbia, S. C.  
 Tour of College Campus and Pastures.  
 Banquet, Clemson House.  
 Toastmaster, B. D. Cloaninger, Head Dept. Fertilizer Inspect. & Analysis, Clemson, S. C.  
 Introduction of Speaker, D. W. Watkins, Director, S. C. Extension Service, Clemson, S. C.  
 "Whither Bound," Dr. Ivan E. Miles, Leader, Extension Agronomy, Mississippi State College, State College, Miss.

#### November 4, Thursday

"Crop Response to Boron and Manganese," Norman R. Page, S. C. Experiment Station, Clemson, S. C.  
 "Research with Tobacco Fertilizer," J. F. Bullock, USDA, Pee Dee Experiment Station, Florence, S. C.  
 "Tobacco Fertilizer Recommendations for 1955," J. M. Lewis, Extension Tobacco Specialist, Florence, S. C.  
 "General Crop Fertilizer Recommendations," Dr. J. B. Pitner, Agronomy Department, Clemson, S. C.  
 "Fertilizer Pesticide Mixtures," Dr. J. H. Cochran, Entomology & Zoology Department, Clemson, S. C.  
 "S. C. Marketing Facilities and Services," J. E. Youngblood, Chief, Extension Division Marketing, Columbia, S. C.  
 "Financing the 1955 Crop," Henry S. Johnson, Director of Information, Farm Credit Administration, Columbia, S. C.  
 "The New Fertilizer Law," B. D. Cloaninger, Clemson, S. C.

#### Toxicity of Hydrocarbon Insecticides

The following is an abstract of a report given at the American Chemical Society meeting, held in New York, September 13-17.

The immediate toxicity of four dimethanonaphthalenes (aldrin, isodrin, dieldrin, and endrin), when compared on the basis of their oral administration to rats or rabbits or as applied and maintained upon the skin of rabbits, depends more directly upon their spatial configuration than upon their empirical composition.

Repetitive applications of aldrin, dieldrin, or DDT upon the skin of rabbits exerted toxic effects decreasingly, according to the type or use of a vehicle, in the following order: (1) in Ultrasene, (2) in a vegetable oil (aldrin and DDT in olive oil and dieldrin in peanut oil), and (3) as dry powders (no vehicle).

When fed over the period of two years to rats of either sex at levels of 2.5, 12.5 or 25.0 p.p.m., none of these insecticides (aldrin, dieldrin, DDT) appear to shorten the lives of the animals, the rate of mortality among the test groups being comparable statistically to that in corresponding control groups. The rates of growth of the test groups were equal to or in excess of that of the controls.

The weight of the livers of the test rats, in relation to their body weights, was somewhat on the high side.

By Joseph P. Treon and Frank P. Cleveland, Department of Preventive Medicine and Industrial Health, College of Medicine, University of Cincinnati, Cincinnati, Ohio.

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## APS Elects Fischer, Hart, Jensen



Newly elected officers: Dr. George W. Fischer, vice president, Pullman, Washington; Dr. Helen Hart, president elect, University of Minnesota; and Dr. James Jensen, president, Ames, Iowa.

THE 46th Annual Meeting of the American Phytopathological Society was held under an unusual and interesting setting at Estes Park, Colorado, August 25-27. The record turnout of over 1200 was largely due to the wives and children who enjoyed to the full the mountain scenery, horseback riding, hiking and other activities provided by the Y.M.C.A. Conference Camp. Over 500 pathologists registered for the science meetings. Also in session were the Pacific Division of the A.P.S. and the Potato Association of America.

The annual banquet in the form of a western chuck wagon dinner was held about a camp fire on the conference grounds. Amusing skits were put on by the Wyoming delegation. This was followed by square dancing in the Assembly Hall.

Dr. James H. Jensen, Provost of Iowa State College, is the new president of the Society, succeeding Dr. George F. Weber, University of Florida. Newly elected are Dr. Helen Hart of University of Minnesota as president-elect; Dr. George W. Fischer, State College of Washington, vice-president; and Dr. William C. Snyder, University of California, councilor-at-large. Dr. A. Frank Ross, Cornell University, succeeds Dr. W. C. Price, University of Florida, as editor-in-chief of phytopathology. Dr. Glenn S. Pound, University of Wisconsin, and Dr. Saul Rich, Connecticut Agricultural Experiment Station, continue respectively as secretary and treasurer of the Society.

By S. E. A. McCallan

Yonkers, N. Y.

It was announced that the 1955 meeting will be held at Atlanta, Georgia, in conjunction with the meeting of the American Association for the Advancement of Science during the week of December 26. The 1956 meeting probably will be in the fall in association with the American Institute of Biological Sciences at the University of Connecticut at Storrs.

Among the sessions held were ones on Soil Treatments, Chemotherapy, Antibiotics, Seed Treatments and Fungicides in which numerous reports of progress in the use of fungicides and control of diseases were made. A long and comprehensive symposium was held on Concepts and Problems of Nematode Diseases of Plants under the chairmanship of Dr. Gerald Thorn. A large number of speakers participated and emphasized the importance of these diseases and need for more extensive studies.

J. R. Shay and W. R. Sitterly, Purdue University, reported on a new disease of apple — *Botryosphaeria* canker, which appears to thrive under extreme drought conditions. Unless checked, the disease becomes a major threat to apple production in Indiana and adjacent states.

Antibiotics were reported to have controlled fire blight of apples and pears by three groups of plant pathologists. In Ohio H. F. Winter and H. C. Young stated that strep-

tomycin applied at 120 p.p.m. at early bloom, full bloom and petal fall was most effective in the orchard control of fire blight. Likewise in California, P. A. Ark and C. E. Scott reported control with 100 p.p.m. of streptomycin, which was better than the standard copper lime dust treatment. Streptomycin dust at 240 p.p.m. was less satisfactory. Neomycin sprays at 50 p.p.m. also appeared promising. J. C. Dunegan, J. R. Keinholz, R. A. Wilson and W. T. Morris reporting for the U.S. Department of Agriculture on experiments at Marysville, California, got best control on Bartlett pear trees with a spray of 100 p.p.m. of streptomycin and 10 p.p.m. of terramycin applied seven times at seven day intervals. They stated there was no russetting of the fruit. A dose of antibiotic material as low as 30 p.p.m. gave better control of fire blight than the standard copper spray material and without the fruit russetting of the latter.

Donald J. Morton, Louisiana State University, isolated a number of organisms from the soil antagonistic to *Sclerotium rolfsii*. In greenhouse tests thirteen actinomycetes and two fungi (*Trichoderma* sp.) reduced the severity of the disease on soybean plants. *Trichoderma viride* invaded and killed *Armillaria mellea* in roots in soil which had previously been fumigated with standard or reduced dosages of carbon disulfide, and the lethal activity of *Trichoderma* continued for at least three months, according to the findings of Ellis Darley and Wesley D. Wilbur, University of California.

The control of several small grain diseases by the water soak method of Tyner was reported by D. C. Arny and Curt Leben, University of Wisconsin. Soaking barley and oat seed in distilled water for 56 hours at 22-24° C. was nearly as effective as was the use of Ceresan M in controlling *Helminthosporium* blights. Loose smut of barley was also controlled when infection was moderate. Soaking reduced the germination of most barley seed. Fewer *Alternaria* and *Helminthosporium* colonies were obtained from soaked seed than from unsoaked.

AGRICULTURAL CHEMICALS

Laurence H. Purdy, Jr., and C. S. Holton, U.S.D.A. and Washington State College, found marked differences in phytotoxicity to spring wheat by overdoses of various fungicides employed in smut control. The maximum permissible dosage for Agrox (6.7% phenol mercury urea) and Ceresan M (7.7% ethyl mercury *p*-toluene sulfonanilide) was 1 ounce per bushel and for Panogen (2.2% methyl-mercury-dicyanidamid) was 2 ounces per bushel. At higher dosages Panogen was consistently less phytotoxic than the other fungicides.

In screening a number of fungicides non-toxic to germinating tree seed (*Pinus banksiana*), Alli Vaartaja, Saskatoon, Canada, noted that thiram, captan, and especially Rimocidin were outstanding. These fungicides gave good protection against both *Rhizoctonia solani* and *Pythium*.

Botrytis on stored dormant roses was inhibited by a 20 per cent pentachloro-nitrobenzene dust applied at the beginning of the storage period by Saul Rich, Connecticut Agricultural Experiment Station. Vancide 51, applied 5 times at fortnightly intervals also gave good control.

F. L. Howard and Barbara Champlin, Rhode Island Agricultural Experiment Station, reported that watering turf prior to application of certain fungicides is required for effective prevention of brown patch. This apparently permits cellulose decomposing fungi to attack the softened sclerotia of *Rhizoctonia solani*. Cadmium-chromium mixture is selectively fungitoxic to *Rhizoctonia sclerotia* but not to its antagonists, while mercury chlorides are specific for *Rhizoctonia hyphae*.

On the last evening in a session on fungicides a number of papers dealt with the nature of fungicidal action. R. A. Ludwig and G. D. Thorn, Science Service, London, Canada, reported in two papers on the mechanism of fungicidal action of the ethylenebisdithiocarbamates. The parent compound, nabam, is essentially non-fungicidal (as also reported by others). Nabam is converted to ethylene thiuram monosulfide on the plant. While this compound is toxic,

the final fungicidal action probably occurs through the rearrangement of ethylene thiuram monosulfide to a highly toxic isothiocyanate. Manganese, zinc and iron ethylenebisdithiocarbamates are believed also to act in a similar manner.

The effects of fungicides on polyphenol oxidase were discussed by Robert G. Owens, Boyce Thompson Institute. Inhibition of the enzyme by dithiocarbamic acid derivatives, except copper salts, and thioureas and thiocarbazides was dependent on a sulfur atom capable of tautomeric conversion to a sulfhydryl group which could complex with the copper atom of the enzyme. Mercuric chloride and other protetin precipitants were less inhibitory, perhaps indicating that the copper atoms are more accessible at the enzyme surface than

are sulfhydryl and other groups subject to attack by protein precipitants. Quinones and phenolic compounds showed little or no inhibitory action on the enzyme.

Hugh D. Sisler, Carroll E. Cox and Paul E. Hochstein, University of Maryland, studied the metabolic processes affected by various fungitoxicants. They concluded that actidione, thiolutin, chloranil, dichlone and glyodin apparently interfere with energy-yielding systems or with energy transfer reactions. Sulfanilamide apparently affects energy-utilizing processes and azide the energy-transfer processes. The same authors in a second paper suggest that captan affects cellular metabolism by blocking key decarboxylation reactions in which thiamine pyrophosphate functions as the coenzyme.★★

#### AAC Plans New Building

A new fertilizer plant north of Humbolt, Ia., is planned by American Agricultural Chemical Co. AAC said the new unit is planned to meet the greatly increased demand for fertilizer by farmers of northwestern Iowa and southern Minnesota.

The new plant, one of 28 A.A.C. plants serving principal agricultural areas in eastern, southern and midwestern U.S., Canada and Cuba, will have an annual productive capacity of approximately 60,000 tons of fertilizer.

The plant site has been acquired by the company, and with engineering plans already completed, ground will soon be broken and work on the foundations started. Construction will be pushed as rapidly as possible before cold weather, in the expectation that the plant will be completed and in operation by early next summer.

#### USDA Reports Insect Advances

USDA entomologists last week reported widespread damage to a variety of crops by the corn earworm, and a serious outbreak of the oriental fruit moth in California.

Idaho entomologists report their first collection of the lesser grain borer, and in Florida, a new scale insect (*Aspidiotus taxodii*) has been

found for the first time infesting bald cypress. Kansas indicated that 40 to 60 per cent of milo and sorghum heads are infested in northern areas of that state, and in central Missouri, damage to heads of grain sorghum continues severe.

#### Spencer New Assistant Mgr.

S. M. Spencer, supervisor of textile bag sales for Bemis Bro. Bag Co., has been appointed assistant manager of the company's St. Louis plant and sales division, effective Oct. 1. He was succeeded as supervisor of textile bag sales by W. J. Ray.

#### Jones Heads Bollworm Unit

Heading the U.S.D.A.'s pink bollworm research laboratory at Brownsville, Tex. is Dr. Sloan E. Jones, entomologist and administrator of Clint, Tex. He was named to the important research post last month by Dr. E. F. Knipling, chief of the Department's Entomology Research Branch. He is assisted by A. J. Chapman USDA entomologist.

Both men are working under Dr. F. C. Bishopp, who is coordinator of the over-all State-Federal-industry research program which is looking for ways of preventing the spread of the cotton insect, which has been described as the world's worst cotton pest.

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### Kirk Joins Velsicol

John F. Kirk was recently appointed vice president and director of sales of the Velsicol Corp., Chicago. Mr. Kirk was formerly connected with General Chemical Division, Allied Chemical and Dye Corp., New York, as manager of the agricultural chemical department.



JOHN KIRK

### Southern Weed Conf. Planned

The eighth annual meeting of the Southern Weed Conference will be held at the Hotel Soreno, St. Petersburg, Florida, January 17-19, 1955, according to a recent announcement by Dr. Warren C. Shaw, president. Dr. Shaw is a USDA agronomist in the Section of Weed Investigations at Beltsville, Md.

Representatives from state experiment stations, USDA, extension services, the agricultural chemical and farm equipment industry, vocational agriculture and the farming industry will attend the 3-day meeting, to discuss weed control in pastures, field crops, horticulture and other phases of agriculture.

Officers for the 1955 Conference include Dr. G. C. Klingman, North Carolina State College, Raleigh, vice president, and Dr. E. G. Rodgers, Florida Agricultural Experiment Station, Gainesville, secretary-treasurer.

### Spencer Names Sanders

Spencer Chemical Co., Kansas City, Mo., announces the appointment of Kirk Sanders, formerly agricultural sales representative in Mississippi, as its southeastern district sales manager. Mr. Sanders replaces John L. Sanders (no relation), who opened the Atlanta operation for Spencer in 1950. John Sanders has resigned to accept a position with the Mississippi River Fuel Corporation, St. Louis, Mo.

As southeastern district sales manager, Mr. Sanders will be in

charge of the Spencer Atlanta office, directing sales in South Carolina, Georgia, Florida and Alabama.

### New V-C Plant Operating

Virginia-Carolina Chemical Corp.'s new plant in Fernald, Ohio, for the production of phosphoric acids and sodium polyphosphates is now in full scale production. Frank R. Keeshan is superintendent and G. G. Morrisette is assistant superintendent.

### Iowa NH<sub>3</sub> Soc. Elects

B. A. Frankl, president of Mor-Gro, Inc., Algona, Ia., was recently named president of the newly formed Iowa Agricultural Ammonia Distributors Association, which includes about 35 distributors of ammonia. Other officers are: J. Rowland, Washington, 1st vice president; W. E. Birdsall, Osage, 2nd vice president; C. E. Jirovsky, Blencoe, 3rd vice president, and J. H. Andrews, Jefferson, secretary-treasurer.

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## WASHINGTON *Report*

by  
**Donald G. Lerch**

Cornwell, Inc., Washington, D. C.  
(Agricultural Chemicals Washington Correspondent)

**A**LADDIN'S lamp, with all its magic power, could scarcely match the marvel of the pesticide industry which is constantly unveiling new developments which startle and amaze. In the fields of product development, legislation and regulations, and effect on allied industries, news seems to be coming faster and faster.

Every company can lay claim to products and formulations which are greatly increasing the efficiency of production, making it possible for farmers to produce more on less ground and in most cases with higher quality and profit potential. The power of these chemicals is little short of unbelievable. With respect to herbicides, as little as a half cup of concentrated chemical, when diluted can kill all vegetation on an entire acre of ground!

Even before the modern herbicides, when the number of insecticides was small and you could count them on two hands, Congress first made specific provision for the regulation of these materials. This was in 1938. In the language of the report submitted to Congress in this last Session on pesticide matters these words appear, "These chemicals have become vital tools in the production of an adequate, wholesome, and economical food supply, and it is accepted that without them the health and living standards of this Nation and other countries dependent upon our food exports would be dangerously impaired."

The chemicals referred to in the Congressional report include the whole lot of materials which are on the market today and which are now under test as the promise of tomorrow. During the 16 years since Congress first acted, the industry and supporting arms of government research and education have brought about many permanent changes in farming and established new concepts in the control of human insect-borne diseases.

Historically, legislative bodies are far behind in developing laws to fit rapidly changing conditions. In the case of this industry, Congress has been busier. The Federal Insecticide Act of 1947 established new legal conditions to meet the rapid changes in the industry.

The latest move by Congress in passing the Miller Amendment, Public Law 518, recognizes the continued rapid progress by the industry. In some respects it sets up a special set of rules for pesticides. It certainly puts them in a class by themselves and surrounds them with special privileges only because they are so essential in the production of food.

Nor, do the new rules for the industry cease here. The Food and Drug Administration has the responsibility for seeing that the industry fully understands the new tolerances which will become effective next year. These residue tolerances will set the ground rules which, when adhered to by all concerned, will maintain a high standard of safety for our food supply.

It is particularly significant that all parties concerned with both the new law and the tolerances sat around the same table at the recent NAC meeting in Spring Lake, N. J., in front of industry leaders and the press, and discussed the measures from many points of view. William W. Goodrich, assistant general counsel, Food and Drug Administration, John T. Coyne, assistant head, pesticide regulation section, USDA, John D. Conner, NAC Counsel, and Joseph A. Noone, NAC technical adviser, all participated in a full, open, discussion.

The many questions from the floor and the frank manner in which they were discussed makes it apparent that the interested parties have spent many hours and days around the conference table—long before this public exhibition. They not only knew each other well, they knew what the other fellow was thinking. In most cases the problem was, who would get the ball to run with. There was no doubt in which direction the ball carrier would run.

In those few exceptions where there were differences in interpretation, it was obvious that the ground had been covered before and that each knew about how far the other fellow would go. The USDA's new responsibility of certifying the usefulness of a chemical takes much of the circus aspect out of procedures and puts the Food and Drug Administration in a better position to carry out the function for which it was created by Congress in the first place, the protection of our food supply.

It is gratifying to know that the parade of witnesses from agricultural colleges to certify that insecticides kill insects will end. These men will be needed for other aspects of the matter and their knowledge and wisdom will be put to better uses.

In the future, activity of this kind will be carried on before the USDA which is in a better position to understand whether a cabbage looper is or is not a serious pest, and how the usefulness of a chemical may relate to quality as well as volume of production.

**AGRICULTURAL CHEMICALS**

Most important, there is an apparent meeting of the minds among the groups over the working of the new law. Since the success of most any law depends upon the spirit with which the parties affected view the measure, there is strong evidence that the Miller Amendment will become recognized as establishing a basis for continued farm and industry progress and further upgrading of the American diet.

The third basis of rapid development of the pesticide industry is its effect on other industries. One of the latest to come within toe to toe distance is the pharmaceutical industry. Or, depending upon how you view it, perhaps it's the pesticide industry which is in for a new run for its dividends.

When a scientist talks about dreams which might be fulfilled, it's time to wake up. That's what some folks did when John C. Dunegan, principal pathologist at USDA's Beltsville Research Station said, "Several years ago I publicly lamented that plant pathologists did not have magic control materials like DDT, parathion, BHC and others possessed by our entomological colleagues. Our prospects are now much brighter, for the antibiotic materials offer possibilities of disease control we hardly dared dream of 10 years ago."

This new power to destroy plant diseases is measured in grams rather than pounds. By adding 38 grams of antibiotic material dissolved in 100 gallons of water, you have yourself a spray solution containing approximately 100 parts per million.

If these antibiotics develop the way they appear to be, the face of agriculture could assume a new look. Pear trees might come back in commercial orchards of the east. Production of other fruit might be made less costly, vegetable and flower yields increased, field crops pushed to new records.

One of the biggest questions is, who is going to sell the antibiotics to farmers for disease control? The established outlets for spray materials are held by the existing pesticide companies. Yet, the volume of anti-

biotics sold for pharmaceutical uses on farm animals and poultry is reaching major proportions.

We used to think the butter-oleo battle made famous the color yellow; but if you pick up any recent issue of a leading farm magazine, they all carry full page ads flashing sparkling yellow as the chief color. You'll see how this or that brand of antibiotic

#### **TIMETABLE FOR MILLER AMENDMENT AND TOLERANCES**

According to George P. Larrick, Food and Drug Commissioner, here is the schedule under which public law #518 which involves residue tolerances will become effective:

1. Proposed regulations for operating under the new law—including details of value to all interested parties.
2. Special residue tolerances for those chemicals upon which there is general agreement, based on 1950 hearings.
3. Issuance of tolerances upon which there may be controversy or upon which considerable research has occurred since 1950.

You can fill in your own dates as these developments occur—but this is the "batting line-up."

makes pigs gain faster or means more eggs per hen. In fact farmers are tossing the language of antibiotics around in a fashion that would bring their poor city cousins to shame.

So, count on the antibiotic manufacturers as having strong roots in the farm sales field. They don't have the same type of outlets in many cases, but they are for the most part merchandisers. They are accustomed to introducing new products and conquering new fields. Antibiotics were virtually unknown 12 years ago. Yet, in that short time production has increased from Zero to an estimated 740 tons last year.

If a story can be found to equal the spectacular success of the pesticide industry, it is here in the antibiotic field. In little more than a decade it has revolutionized the field of medicine, made possible new concepts in livestock and poultry management. Now it is gaining entrance in the field of plant disease control. What kind of living conditions will this newcomer find?

Fertilizer men are busy counting up the acres of crops which they now believe will be planted following the lifting of "total acreage allotments" by Secretary Benson. There are dozens of ways to figure what this will mean business-wise. Most of those we've talked to come up with an increase ranging from two to five percent. This is the amount of increase they expect now that farmers can plant cash crops, in fact anything on land taken out of restricted crops, except another crop on the same list.

Total allotments was the feature of the new farm program which had the most "bite." It was this set of restrictions, as reported to you last month, which was meeting with the most opposition. Probably most farmers realize that continued high price supports distort production and cost relationships so that, in the long run, it is the farmer who reaps the reaction. Potatoes and dairy products are two excellent examples.

Drought conditions along with general protests brought about the change. Now that farmers can plant barley, soybeans, oats, and a host of cash crops on land taken out of wheat, cotton and other restricted crops, they will tend to use more fertilizer. But with so many changes facing farmers this new growing season, better keep close to the ground to know what's going on.

\* \* \*

In connection with fall business, the National Fertilizer Association is giving colleges an "assist" by taking the research data on profits made from use of plant food and giving it wide distribution. This material is being sent to editors, radio and television stations and others who are in a position to inform and advise farmers.

There are many activities which business supported organizations can engage in which are not becoming to public institutions. There is also the matter of extent. There is probably room for colleges to do a better job of getting usable information to farmers. This includes the type of information being put out by NFA.

(Continued on Page 109)



## REAPING THE PROFITS



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AGRICULTURAL CHEMICALS

**Spurrell  
Joins  
Vulcan**



New assistant to the president of Vulcan Steel Container Co. is Donald M. Spurrell, graduate of the University of Alabama and a Navy veteran. He joined the Birmingham, Ala., company as assistant to Gordon D. Zuck, president. The company makes steel pails and drums for agricultural chemicals and other products.

**Tenn. Corp. to Split Stock**

Tennessee Corp. directors last month called a special stock holders meeting to be held November 10th, to vote on a proposal to split the common stock two-for-one. Stockholders will also vote on increasing the authorized common stock to 2.2 million shares of \$2.50 par from 1.1 million shares of \$5.00 par value.

**Vulcan Opens Can Unit**

Vulcan Containers Limited, Toronto, has begun manufacture of steel shipping containers and tin cans at its newly established plant. The containers will be marketed for pesticides and other products, the new company announced.

**Cadle At Sales School**

James E. Cadle, vice-president in charge of sales, representing Baughman Manufacturing Co., Inc., Jerseyville, Ill., returned last month from the Graduate School of Sales Management and Marketing at Rutgers University, New Brunswick, N.J. The class consisted of 135 men from varied companies.

**Carpenter, Totman, New VPs**

Northern Chemical Industries, Inc., at its tenth annual meeting at Searsport, Maine, reelected present officers and added two new vice presidents: Dr. C. LeRoy Carpenter, present Director of Research and formerly with Grace Chemical Co., and James C. Totman, present manager

of the Bangor office of Summers Fertilizer Co. Mr. Totman is also assistant treasurer and director of Summers.

J. E. Totman stated favorable progress is being made enlarging the Searsport facilities of Northern Chemical. Contemplated expansion of activities, for which a Government Certificate of Necessity has been issued, covers a 120 ton per day anhydrous ammonia plant as well as nitric acid, nitrogen solutions and nitrophosphatic facilities.

**Garden Trade Show in Oregon**

The fourth annual Northwest Garden Supply Trade Show will be held at the Shrine Auditorium, Portland, Ore., October 19 and 20. A panel discussion by several retailers on "What the Wholesaler Can do for the Retailer" has also been scheduled.

**Installs Dust Control Equip.**

The Fertilizer and Equipment Co. of Green Bay, Wisc., recently engineered and installed equipment to control fumes and dust at the Iowa Farm Supply Co. plant at Des Moines.

**New Iowa Fertilizer Co.**

Super Plant Foods, Inc., is a new Ottumwa, Iowa, concern which will be in operation later this year, manufacturing granular fertilizer.

**Market Research Group Meets**

The Chemical Market Research Association held their annual meeting September 19-21 at the Equinox House, Manchester, Vermont. R. E. Chaddock, Hercules Powder Co., Del., chairman, discussed "Management Looks at Market Research." R. W. Warren, American Cyanamid Co., reviewed the question of "Reporting to Management."

Other speakers scheduled for the 3-day meeting included: H. Riemer, Nitrogen Division, Allied Chemical & Dye Corp.; J. A. Sargent, Diamond Alkali Co.; C. A. Gerstacker, Dow Chemical Co.; S. J. Osborne, Mathieson Chemical Corp.; E. Ott, Hercules Powder Co.; M. L. Moore, Vick Chemical Co.; P. N. MacLaren, Hooker Electrochemical Co.; and H. K. LaRowe, American Cyanamid Co.

F. E. Baldwin, Ethyl Corp.; E. E. Winne, Grace Chemical Co.; H. W. Dahlberg, Jr., International Minerals & Chemical Corp.; R. J. Musser, Union Carbide & Carbon Corp.; and A. A. Williams, Celanese Corp. of America.

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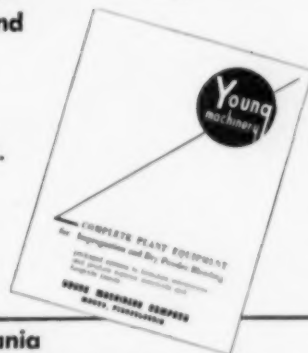


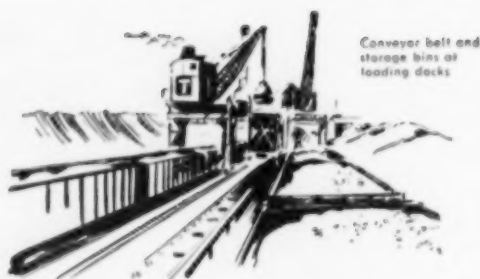
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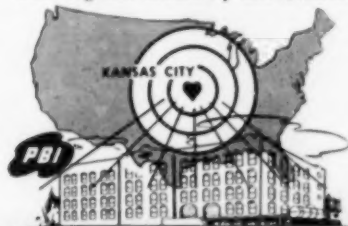
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## NEWS

### Brevities

UNITED COOPERATIVES are reported to be moving their headquarters from Philadelphia to Alliance, Ohio.

\*\*\*\*\*

ANTARA sales manager, H. Shelton announced the appointment of J. P. Madden as manager of Inorganic Chemicals of Antara Chemicals, sales division of General Aniline & Film Corp.

\*\*\*\*\*

D. H. BURGER has joined the M. A. Division Wyandotte Chemicals Corp., Wyandotte, Mich., as administrative assistant in the organics group.

\*\*\*\*\*

SPENCER CHEMICAL CO., Kansas City, Mo., announced the employment in chemical research of Dr. W. C. Francis as staff member in organic chemistry.

\*\*\*\*\*

MICHIGAN CHEMICAL CORP., St. Louis, Mich., announced the appointment of Dr. J. R. Gump as research supervisor in charge of the company's inorganic research station. D. Kase and R. Meyerand were named process engineers.

\*\*\*\*\*

NITROGEN DIVISION plant of the Allied Chemical & Dye Corp. in Hopewell, Va., appointed M. W. Butler as assistant general superintendent.

\*\*\*\*\*

KRAFT BAG CORP., New York, recently announced the appointment of J. W. Taylor to head research, sales promotion and advertising.

\*\*\*\*\*

JAMES C. TOTMAN, assistant treasurer of Summers Fertilizer Co., and vice president of Northern Chemical Industries, was re-elected to his third two-year term in the Maine State Legislature.

AMERICAN CYANAMID CO.'s research division last month announced the appointment of D. J. Salley as assistant director of the newly formed Basic Research Department; and R. H. Kienle as director of the newly formed Research Service Department. R. P. Chapman will be assistant director of the department.

\*\*\*\*\*

FLETCHER L. MUNGER, was recently appointed assistant to the vice-president in charge of sales for Gilman Paper Co., Chicago, and its subsidiary Kraft Bag Corp.

\*\*\*\*\*

A NEW FIRM for the manufacture of agricultural chemicals was incorporated recently in Mission, Kansas by G. Hinkle, Z. Hinkle, T. F. Wilburn and J. Brewer. The company will be known as Midwestern Spray Chemical Co.

\*\*\*\*\*

THE DALLAS CITY council last month made it illegal to store hexachloro epoxycyclohexane endo-endodimethano naphthalene, except in a fire-proof, locked storage room. The compound is manufactured and sold for cotton insect control.

\*\*\*\*\*

EL SALVADOR has set up new regulations governing the importation, manufacture and sale of agricultural chemicals. A certificate of approval issued by the Ministry of Agriculture and Livestock is required for handling, sale, etc., of the agricultural chemicals and fertilizers.

\*\*\*\*\*

HAMMOND BAG & PAPER CO. recently appointed Robert I. Sutter to its sales force. Mr. Sutter will represent the company in the Ohio territory.

## Suppliers' BULLETINS

### New Miticide Folder

An informational folder giving instructions on application of "Aratron" to destroy heavy infestations of spider mites on crops has been issued by the Agricultural Chemicals (Eston Chemicals) Division of American Potash & Chemical Corp., Los Angeles.

Outstanding feature of Aratron, according to American Potash & Chemical Corp., is its immediate and effective killing powers on heavy mite populations in agricultural and ornamental crops. Aratron contains Aramite as the active ingredient.

Two types are available: Aratron-25W, a 25 per cent wettable powder for use as a spray or as a dust concentrate for blenders; and Aratron-25E, an emulsifiable solution containing two pounds of aramite per gallon.

### The ABC's of HNH<sub>a</sub>

A 20-page booklet reviewing the 20-year growth of use of anhydrous ammonia in agriculture was recently published by the Bastian-Blessing Co., Chicago, manufacturer of valves and fittings. The booklet discusses ammonia use, how it is distributed and how it is applied to farmland.

### New Thanite Booklet

A new technical booklet on the properties and uses of "Thanite" was issued recently by the Hercules Powder Co., Wilmington, Del. Thanite is a 100 per cent active toxicant composed of a minimum of 82 per cent isobornyl thiocyanacetate or equivalent, and a maximum of 18 per cent other active related terpenes.

Fields of application for Thanite, described in the new 26-page booklet,

include household sprays, livestock sprays, aerosols, and pesticides for a wide variety of formulations. Information about the use of this toxicant against insects such as houseflies, horn flies, mosquitoes, fleas, lice, bedbugs, ants, silverfish, moths, and roaches is included.

The booklet gives properties of Thanite, formulations, a brief discussion of its application, a report on its physiological activity, methods of assay, and a bibliography of published material relative to Thanite and its application.

### Molybdenum Product Bulletin

A new bulletin, intended as a guide to the selection of molybdenum products for applications in the chemical process industries was issued recently by Climax Molybdenum Co., New York. The bulletin describes the various molybdenum compounds and their properties.



"No, no, operator, the name is Patch— P for pyrethrum, A for aldrin, R for rotenone, T for toxaphene, C for chlordane, H for heptachlor!"

Courtesy Progressive Farmer

### Grain Fumigant Bulletin

A technical bulletin #806R on "Westvaco Grain and Mill Fumigants" was issued recently by Food Machinery and Chemical Corp., New York. The eight-page bulletin lists insects controlled, means of application, dosages, aeration requirements, and physical and special properties of the various fumigants.

### New Mosquito Control Booklet

A new folder entitled "Mosquito Control With Heptachlor" was released recently by the Velsicol Corp., Chicago, manufacturers of chlordane and heptachlor. The folder presents information for larva and adult mosquito control for abatement projects, urban areas and parks. Rate of application table to guide in accurate preparations and suggested methods of using heptachlor are presented.

### Mine Safety Booklet

"Disaster," a new booklet designed to assist industrial plants in choosing safety and rescue equipment for use in emergencies was published recently by Mine Safety Appliances Co., Pittsburgh.

While the booklet makes no attempt to outline the organization of a disaster-control plan, it does assume the existence of groups or teams within a plant whose job it is to effect rescue and recovery operations. It shows just what items of equipment are needed in emergency operations.

### Ammonia Equipment Bulletin

A new catalog has recently been issued by the Anco Manufacturing & Supply Co., Tulsa, Okla., describing complete stocks of anhydrous ammonia equipment. Information on bulk plant equipment, storage tanks, field and applicator tanks, as well as pumps, compressors, valves, hose, couplings, and other accessories is included in this catalog.

### Chlordane Bulletin

CHLORDANE AS A TERMITE SOIL POISON by R. A. St. George. Release by the USDA, summarizing experimental results on the progress of work with chlordane. Velsicol Corp., 330 E. Grand, Chicago.

AGRICULTURAL CHEMICALS

### Aldrin-Fertilizer Combination

A combination of aldrin, either in liquid or granular form, with fertilizer mixtures is recommended in a new bulletin prepared by Private Brands, Inc., Kansas City, Kan. The company asserts fertilizer mixers can profit by adding the insecticides to their mixes to combat soil insects and fertilize crops at the same time.

A special feature of the company's plan is a "Label Registration Department," which handles all registration details for the mixer, according to the bulletin. Bulletin lists advantages of the mixture, dilution table for aldrin and procedure for mixing. It can be obtained from the company at 300 South 3rd St.

### New Worthington Ammoniator

A new continuous ammoniator for manufacturers of dry commercial fertilizer is described in a recent bulletin issued by Worthington Corp., Harrison, N. J. The company says the ammoniator, developed as a result of T. V. A. experiments, provides more efficient ammoniation without loss of volatile gases.

Bulletin R-1701-S1 describes the unit in detail, giving all specifications and method of operation.

### S. C. Fertilizer Booklet

"Farming for Profit in South Carolina" is the title of a forceful booklet issued recently by the South Carolina Plant Food Educational So-

ciety. It was released at the fifth annual meeting of the society Sept. 13 in Clemson. A 16-page brochure, printed in two colors, it is intended to convince bankers in the state of the important and necessary role of fertilizers in reducing costs and increasing unit profits.

Raoul Allstetter, vice president of the National Fertilizer Association, presented a series of charts at the meeting, on the subject of fertilizer economics.

### Acrylonitrile Described

Data on acrylonitrile, important as an intermediate in the manufacture of soil conditioners and many other products, is given in a booklet prepared by American Cyanamid Co.

The 16-page booklet, issued by the Petrochemicals Department of the company, 30 Rockefeller Plaza, New York 20, N.Y., is concerned with the toxicity of the material. It also traces the background and development of acrylonitrile, which was first synthesized in 1893.

### CCDA to Hold 1st Meet

The Commercial Chemical Development Association last month announced plans to hold its first fall outing meeting at the Bedford Spring Hotel, Bedford, Pa., on October 6-8. The theme of the meeting will be "Foreign Chemical Development . . . and its importance to the American chemical industry."

### New Lion Plant in Operation at Luling, La.

Representatives of Lion Oil Co. and Fulton Bag & Cotton Mills gather to watch some of the first bags of ammonium nitrate emerge from the packing line at Lion's new \$1 million dollar Barton Plant, Luling, La. The Fulton multi-wall paper bags were supplied from the company's nearby New Orleans plant for use by this large nitrogen-fertilizer installation. Viewing the operations (left to right): J. Frank Greeley, Fulton's Multiwall Paper Bag Division manager; W. G. East, purchasing agent for the Barton



plant; L. J. Even, Fulton's New Orleans sales supervisor; J. M. Elsas, vice president and New Orleans manager for Fulton; and R. L. Van Zandt, Lion's Barton plant superintendent.

## Berkshire

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### POTNIT

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55 New Montgomery St., San Fran. 5, Cal.  
Cable Address — "Berkkem" New York

## INDUSTRY Patents

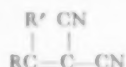
The information below is furnished  
by patent law offices of

**LANCASTER, ALLWINE & ROMMEL**

402 Bowen Building  
Washington 5, D. C.

The data listed below is only a brief review of recently issued pertinent patents obtained by various U. S. Patent office registered attorneys for manufacturers and/or inventors. Complete copies may be obtained direct from Lancaster, Allwine & Rommell by sending 50c for each copy desired. \$1.00 for Canada. They will be pleased to give you free preliminary patent advice.

2,683,659. HERBICIDES. Patent issued July 13, 1954, to Arthur H. Schlesinger and David T. Mowry, Dayton, Ohio, assignors to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware. The method of destroying undesirable plants which comprises applying to said plants a toxic quantity of a herbicidal composition including, as the active ingredient, a compound selected from the class consisting of malononitrile and derivatives of malononitrile, said derivatives having the formula



in which R is selected from the class consisting of the cyclopropyl, the furyl and the thienyl radicals and R' is selected from the class consisting of hydrogen and the methyl radical.

2,683,660. HERBICIDAL COMPOSITIONS. Patent issued July 13, 1954, to Arthur H. Schlesinger, Dayton, Ohio, assignor to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware. A herbicidal composition comprising an oil-in-water emulsion of a dialkyl chloromaleate in which each alkyl radical has from 1 to 12 carbon atoms, said chloromaleate being present in said emulsion in a quantity which is toxic to plant life.

2,684,295. CHARCOAL FERTILIZER COMPOSITIONS. Patent issued July 20, 1954, to William H. Eyster, Emmaus, Pa., assignor to Eastern States Soilbuilders,

Inc., Sharpsburg, Md., a corporation of Maryland. A fertilizer composition comprising insoluble mineral fertilizer in admixture with activated charcoal having substantial ion-exchange properties, said charcoal comprising about 2 to 10% of said composition, the ion-exchange properties of said activated charcoal serving to make said insoluble mineral fertilizer available for plant utilization.

2,685,151. VAPORIZATION OF AMMONIA. Patent issued Aug. 3, 1954 to Elton E. Rush, Waco, Tex., assignor to Phillips Petroleum Co., a corporation of Delaware. A process for vaporizing liquid ammonia at a rate satisfactory for metering and introduction into irrigation water which comprises partially vaporizing liquid ammonia beneath the surface of the irrigation water, conducting the ammonia vapors into the irrigation water, and utilizing the heat of solution of ammonia in water to aid in affecting further vaporization of liquid ammonia.

2,686,179. STABILIZATION OF CROPS. Patent issued Aug. 17, 1954, to Joseph A. Chenicek, Bensenville, Ill., assignor to Universal Oil Products Co., Chicago Ill., a corporation of Delaware. A process for stabilizing crops subject to oxidative deterioration which comprises applying thereto an inhibitor comprising a N,N'-di-alkylene-p-phenylene diamine wherein the alkylene groups contain from 6 to 12 carbon atoms each.

2,686,990. METHOD OF HORTICULTURAL SPRAYING OR DUSTING. Patent issued Aug. 24, 1954, to Vinton H. Matthews, San Jose, Calif., assignor to Food Machinery and Chemical Corp., San Jose, Calif., a corporation of Delaware. The method of applying pesticide material to a tree comprising entraining finely divided particles of pesticide materials in converging blasts and directing such blasts into the foliage of a tree to converge interiorly of the tree while moving them past the tree, said blasts being directed toward the tree from points spaced one ahead of the other in the direction of movement thereby displacing the foliage successively in different directions and creating a turbulence in the foliage of the tree so that the entire surfaces of such foliage receive a deposit of the pesticide material.

2,687,348. HERBICIDAL COMPOSITIONS. Patent issued Aug. 24, 1954, to Milton Kosmin, Dayton, Ohio, assignor

to Monsanto Chemical Co., St. Louis, Mo., a corporation of Delaware. A herbicidal composition comprising an oil-in-water emulsion of the condensation product of substantially one mole of an alkylene polyamine having not more than 4 amine radicals per molecule and from 2 to 3 carbon atoms in the alkylene radical and substantially one mole of a substantially mono-chlorinated kerosene, said condensation product being present in said composition in a quantity which is toxic to plant life.

2,687,365. WARFARIN RODENTICIDE BAIT COMPOSITION AND PROCESS OF MAKING SAME. Patent issued Aug. 24, 1954, to Karl Paul Link, Middleton, Wis., assignor to The d-Con Company, Inc., Chicago, Ill., a corporation of Illinois. A multiple dosage type rodenticide composition comprising cereal grain coated and impregnated with 3-(4-acetonylbenzyl)-4-hydroxycoumarin, said grain being provided with a coating of mineral oil covering said 3-(4-acetonylbenzyl)-4-hydroxycoumarin coated and impregnated grain, and an external coating of corn syrup solids covering said mineral oil coating, said composition containing at least 0.025% 3-(4-acetonylbenzyl)-4-hydroxycoumarin by weight on the dry substance basis.

The process of preparing the composition of claim 1 which comprises spraying the cereal grain with an ethanol solution of 3-(4-acetonylbenzyl)-4-hydroxycoumarin, drying the sprayed grain, spraying the dried grain with mineral oil, then spraying the resulting oil coated grain with a corn syrup solution, and then drying the grain.

2,687,945. PROCESS FOR THE CONTINUOUS PRODUCTION OF CALCIUM-CYANAMIDE. Patent issued Aug. 31, 1954, to Joseph Daniels, Essen, Germany. A process for the continuous production of calcium cyanamide by chemically reacting an elementary nitrogen with finely divided solid calcium carbide which comprises forming a homogeneous suspension of finely divided calcium carbide with a combustible hydrocarbon gas, blowing said suspension as a jet into a reaction zone maintained at a temperature which will effect reaction between calcium carbide and nitrogen, separately introducing oxygen and a gas containing elementary nitrogen heated to approximately reaction temperature into said reaction zone in the immediate neighborhood of the point of introduction of said suspension, the ratio of oxygen to combustible hydrocarbon gas being high enough to convert said hydrocarbon gas into carbon monoxide and hydrogen, and so maintain the high temperature necessary to cause the reaction between calcium carbide and nitrogen to occur, but insufficient to cause the production of substantial quantities of carbon dioxide and water, maintaining the calcium carbide in suspension until the reaction is complete, cooling the reaction products and separating the calcium cyanamide so formed from the other reaction

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products and from the uncombined calcium carbide and recovering said calcium cyanamide.

### New Trademarks

**NITROLIME**, in capitals with picture of Dutch girl, for fertilizer. Filed P. R. Jan. 8, 1953, Am. S. R. April 16, 1954. Use since Nov. 26, 1952.

**GLORION**, in capitals, for fertilizer and soil builder. Filed April 29, 1954, by Soil Builders International Corp., New York, N. Y. Use since April 26, 1954.

**MEMA**, in capitals, for chemical seed disinfectant. Filed Dec. 8, 1953, by Plant Protection Ltd., London. Use since on or before Feb. 20, 1951.

**ROUGH AND READY**, in capitals, for rodenticides and insecticides in powder, paste and liquid form. Filed April 14, 1953, by J. T. Eaton & Co., Inc., Cleveland, O. Use since Nov. 1, 1932.

**AMID-THIN**, in shaded letters, for chemical compositions for thinning fruits in order to enhance the quality of the remaining fruit. Filed Sept. 2, 1953, by American Chemical Paint Co., Ambler, Pa. Use since Feb. 2, 1953.

**HIDE**, in capitals, for insecticide. Filed March 18, 1954, by Clarence Boord, Leon, Ia. Use since Oct. 2, 1950.

**TETRASPOT**, in diamond shape, for economic poisons in the nature of an insecticide for fumigating grains. Filed Jan. 25, 1954, by Douglas Chemical Co., doing business as Douglas Chemical and Supply Co., Inc. North Kansas City, Mo. Use since December, 1950.

**BEM BRAND**, in capitals, with word "brand" disclaimed, for fertilizer. Filed June 15, 1953, by Thurston Chemical Co., Joplin, Mo. Use since May 1, 1948.

**ARAGRO**, in a banner, for fertilizers. Filed Sept. 25, 1953, by William H. McNeely, d.b.a. Arachem Products, San Diego. Use since Aug. 28, 1952.

**GRACE**, A WORLD OF EXPERIENCE, on a big letter "G," for nitrogen fertilizer containing prilled urea. Filed Dec. 11, 1953, by Grace Chemical Co., New York. Use since Nov. 4, 1953.

**URANA**, in capitals, for nitrogen-containing solution, suitable for use as fertilizer and in the manufacture of fertilizer. Filed June 26, 1952, by Allied Chemical & Dye Corp., New York. Use since April, 1952.

**SOILO VITAMINO**, for fertilizers. Filed Feb. 17, 1953, by Robinson Manufacturing & Fertilizer Co., Inc., Grand Junction, Col. Use since Feb. 4, 1950.

**FLORIUM**, for fertilizer. Filed April 17, 1953, by Monsanto Chemical Co., St. Louis Mo. Use since April 14, 1953.

**NURIUM**, for fertilizer, same as previous.

**NUTRIUM**, for fertilizer, same as previous.

**SHUR-LEAF**, for insecticide. Filed Dec. 7, 1953, by General Insecticide Co., Inc., Utica, N. Y. Use since Sept. 15, 1951.

**TELVAR**, for weed killing compounds. Filed Feb. 15, 1954, by E. I. du Pont de Nemours and Co., Wilmington. Use since Feb. 3, 1954.

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### PNPFO to Hold 5th Meeting

The fifth annual convention of the Pacific Northwest Plant Food Association will be held at Sun Valley, Idaho, October 5-7.

Reports dealing with soil deficiency problems, fertilization, application of nutrients, are scheduled for the 3-day meeting. Speakers at the business sessions will include H. J. Gramlich, Chicago Northwestern Railroad; J. Culpepper, Spencer Chemical Co., Kansas City; J. Hood, Washington Bankers Association; and J. Jackson, General Petroleum Corp. of Los Angeles.

### Agronomy Program Set

Latest research progress in soil fertility, plant nutrients, weed control and other aspects of soils and crops will be discussed at length Nov. 8-12 when leading agronomists from all parts of the United States converge on St. Paul, Minn. for the annual meeting of the American Society of Agronomy. Meeting in conjunction with ASA will be Soil Science Society of America, Crop Science Divisions and Agronomic Education Division.

All meetings will be held in the St. Paul, Lowry and St. Francis Hotels, with the former as convention headquarters. Divisional meetings will be divided among the hotels, with the annual dinner, Nov. 10, scheduled for the main ballroom of the St. Paul. The presidential address, by C. J. Willard, at the dinner, is titled "Weed Control—Past, Present and Future."

At the general meeting, opening the ASA sessions, L. H. Norton will give a talk on the aims and objectives of the Food and Agricultural program of the U. S. Foreign Operations Administration. Mr. Norton is assistant director, Office of Food and Agriculture, Foreign Operations Administration, Washington, D. C.

Expected to be of special interest at the soil fertility section meetings will be a report by two Florida agronomists on the new field of chelated metals for plants. The speakers will be I. Steward and C. D. Leonard, Univ. of Florida.

Scores of other technical papers

on fertilizers and pesticides are scheduled to be given during the week. Industry exhibitors who will have displays include Climax Molybdenum Co., New York; General Chemical Division, New York; Highway Equipment Co., Cedar Rapids, La.; and Phillips Chemical Co., Bartlesville, Okla.

### NAC CONFERENCE

(Continued from Page 44)

plained. Speaking on the first topic, Frank H. Jeter, Director of information for the School of Agriculture, North Carolina State College, declared that the industry must give proper attention to telling the values of pesticides if it is to get a fair share of the farmer's business.

W. R. Dixon, assistant general sales manager of The Dow Chemical Co., Midland, Mich., described his company's personnel program.

He used a hypothetical case history of a young man applying for a sales job to describe the training program. Key requirements for prospective employees, he stated, are the following: intelligence, willingness to work, loyalty, ability to get along with others and ability to sell.

### Considering the Customer

TWO views of the industry's customers—youth and the farmer—were given in another section of the program. Kenneth H. Anderson, associate director, National Committee on Boys and Girls Club Work, related his experience with the former, while E. H. Fallon, assistant general manager, Cooperative G. L. F. Exchange, Inc., Ithaca, N. Y., covered the latter subject.

Mr. Anderson emphasized the importance of making friends with the youth of the country in order to win friends and customers for the industry.

The necessity of finding out just what farmers want and need, and then supplying it to them efficiently and at the right price was the message of Mr. Fallon, who drew on his long experience with G. L. F. to support his views.

In reviewing the question of "What do you know about your no-

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1 customer . . . the farmer?" E. H. Fallon, Cooperative G.L.F. Exchange, Inc., Ithaca, N. Y., presented the following statistics for 1850 and 1953:

	1850	1953
population	23 million	160 million
people on farms	19 million	24 million
% population on farms	85%	15%
No. farms	1.5 million	5.4 million
% labor force in agriculture	85%	11%
No. horses	14 million	5.4 million
No. tractors	0	3.7 million

Mr. Fallon pointed out that agricultural chemicals will have as revolutionary an effect on agriculture as mechanization has had in the past 50 years . . . that we have embarked on the chemical age in agriculture. He pointed out also that the farm market totaled some \$33 billion annually, and that 1.2 billion of this total is spent on fertilizer, lime, agricultural chemicals, and miscellaneous items. Mr. Fallon reminded his listeners that a particularly important consideration in selling the farmer equipment, is the selling of service on each item offered. He also stressed the importance of quality in products sold and stated that an honest appraisal of the farmers needs with special reference to selection of materials to meet actual requirements would cultivate the best future market for agricultural equipment and materials.

Filling out the social side of the program was a golf tournament, with

C. F. Hogg, Hercules Powder Co. in charge, a get-together dance in the ballroom of the Essex and Sussex and the annual association banquet. ★★

## WASHINGTON REPORT

(Continued from Page 97)

At the same time, many colleges are under staffed and have a wide range of responsibilities. Usage of more fertilizer is a part of the extension program of most colleges. But there are limits on their time and resources. Furthermore, there is the question as to how much education activity should be considered a part of the tax payers' responsibility.

Consequently, many are glad to see NFA taking an active role in the educational field. As long as the material is authentic, there is every reason to believe it will be effective. In this television age, who can prove but that business can be more effective than tax supported institutions in selling ideas?

\* \* \*

Another chapter in the education field is being prepared by the American Plant Food Council. Judging by the material assembled thus far, it is going to set new standards of accomplishment.

The Council has just completed another series of planned tours for leading agricultural editors. This latest one included meetings at several

agricultural colleges where various aspects of soil research and investigation were reviewed.

As a result, I have seen yards of farm magazine columns written as the direct result of bringing editors and scientists face to face. This means that farmers are being given an even better chance to learn about the latest findings of research specialists. Consequently, they should be able to see for themselves why heavier fertilizer applications are profitable in so many instances.

\* \* \*

An interesting sidelight of the National Agricultural Chemicals meeting was the attendance of Hildgard Rettweiler as a guest of one of the member companies. The Doctor spoke very hopefully of the future for the agricultural chemicals industry, both in the United States and for the company she represents — Farbwerke Hoechst A.G., Frankfurt a.M., Hoechst, West Germany. She combines those priceless qualities of wit and charm. As an economist she is most interested in exploring the avenues of commerce.

With respect to imports of agricultural chemicals from Hoechst to the United States, she says: "It is my opinion that they will always be very small in comparison to the American production, especially as the American capacity is increasing far more than in any other country. There might be some specialties, of

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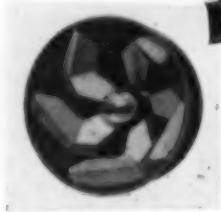
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course, such as fertilizers with certain trace-elements lately developed by Hoechst which have been used as additions successfully in research and practice."

## ROUND TABLE

(Continued from Page 45)

gested that a more effective grind can be obtained by grinding the component materials of a mixture separately, and reducing the size to that of the finest component (which is usually potash), rather than grinding the completed mixture.

**An Automatic Batching Operation**  
FOLLOWING an introduction by W. L. Inglett, of Inglett & Corley Co., Augusta, Ga., W. F. Jacobi, Machinery Div., Union Bag & Paper Co., N. Y. C., outlined the automatic batching system. He pointed out that the first consideration in selection of such equipment is the adaptation to facilities already available in a plant, and the overall size of the operations.

Briefly, the I & C automatic batching system starts with payloader loading of a feed supply hopper, (the material is screened and goes through a clod breaker before passing to the feed supply hopper), it then passes to an automatic discharge belt and flows to the weigh hopper, which discharges automatically to the mixing and bagging system. The cycle of weighing and dumping a one-ton batch requires a maximum of 60 seconds. Automatically controlled vibrators are used in connection with the supply hoppers.

Mr. Jacobi indicated that one actual installation, using an 8-unit batching system feeds 60 tons per hour to a two-ton mixer. Georgia brand fertilizers, 4-8-6 are produced in this particular plant and reported to show a good analysis. The bagging unit used in connection with this plant operates at 60 tons per hour.

Particle size and fines are readily recognized as important factors in the production of granular fertilizers. Wayne King of the W. S. Tyler Co., Cleveland, reviewed screening operations in a fertilizer plant, considering

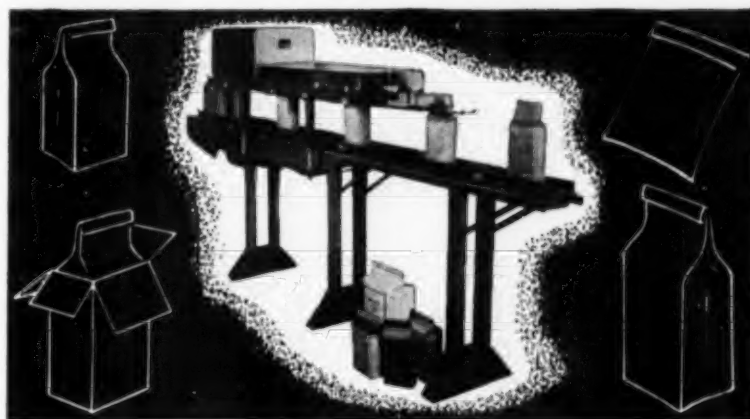
the selection of screens, and classification. Mr. King indicated that a 10-mesh screen is about as fine a particle size as can be used practically in any volume operation.

J. K. Martin, Posey Iron Works, Lancaster, Pa., discussed batch mixers and reported that the power and mechanical requirements of these mixers are related to such properties of the product as flow, pulp density, particle size and shape, adsorption, absorption, and surface tension. He indicated that mixing is basically a two-phase operation, i.e., (1) the blending of the solids and (2) dispersing of the liquid additive. Mr. Mart reviewed power requirements and output, giving specific examples. Wilhelm, of the Patterson Foundry & Machine Co., Baltimore, continued the discussion of mixing units, and pointed out that phosphate rock may be acidulated in a pug mill in the preparation of super phosphate, using a double shaft machine . . . and that

a 30 ton per hour operation might require 150 hp. In reply to a question, W. E. Schaffnit, Stedmann Foundry & Machine Co., Philadelphia, advised that ammoniation has been done in a pug mill, and that the limiting factor to such use of the mill is the desired rate of ammoniation, and whether ammonia solutions or anhydrous ammonia are used. He indicated that only a low rate of ammoniation can be used, and that the ammonia lines must be below the surface of the fertilizer in the mill.

The DehydrO-Mat drying unit was described by G. Halldorsson, E. Renneburg & Sons, Co., Baltimore. The complete operation of the unit, action of the lifting flights, power unit, cyclone collector, overall dimensions, etc., were detailed by Mr. Halldorsson. Mr. E. J. Leister, also of E. Renneburg & Sons, then described a rotary cooler which has a capacity of about 25 tons of material per hour.★★

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## MALEIC HYDRAZIDE

(Continued from Page 47)

MH, reducing the number of cuttings needed by the hedges during the growing season.

Since it has also been shown that MH retards terminal tree growth, (28) experiments are underway to compare the effectiveness of MH with hand pruning of trees interfering with electrical wires.

Several other interesting uses for the chemical are now in the development stage. Selective control of white cockle and curled dock, two common weeds in the North Central States, is obtained by spraying one pound MH active per acre to prevent flowering of these weeds, and thus materially increasing the yield of alfalfa. (6) Wild oats, a serious weed in over 61,000,000 acres in the plains states (33), are selectively controlled with one pound of MH active per acre applied during flowering of oats to prevent formation of viable seed. Seed of wheat and barley have already been set at the time oats are in flower and are not affected. (13)

Use of MH has been substituted for hand removal of runners of spring-bearing strawberries to secure increased yields (7) and for hand pinching of chrysanthemums. (2) A dip of cut roses in a dilute MH solution permits their storage for 22 days before sale (3) and extends life of the flowers by three days in the home. (8)

Studies of the manner in which MH acts through the use of the tagged molecule and formulation improvements promise to extend the uses of MH. This seems true particularly in fields where precise dosages are needed to get such effects as development of male sterile sorghum, (17) thinning blossoms of peaches, (14) or increasing the yield of sugar beets. (18)

Present formulations are somewhat less active in areas of 40% relative humidity or less. The different response is more striking with the crystalline sodium than with the amine salt of MH. The slow absorption of MH over a 24-hour period by

some plants such as grasses and potatoes may be a disadvantage in areas where rainfall is frequent.

Experiments are progressing with synergist combinations which promote penetration of MH and assist in correcting for a decreased effect under low humidity conditions.★★

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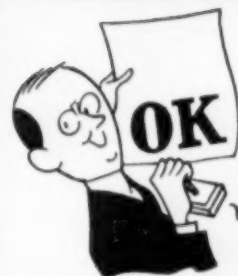
## CEREAL INSECTS

(Continued from Page 61)

of Arkansas approximately 100 percent of the sorghum heads in many fields were attacked. Some soybean damage was also reported. At Knoxville, Tennessee large numbers of moths were being caught in light traps. Heavy infestations were in several fields of cowpeas raised for canning and freezing in the Fort Valley, Georgia, area. Sorghum in the Clinton, North Carolina, area was heavily infested. Massachusetts reports indicated that infestations were lighter than in 1953 and although Maine infestations were light some injury occurred in Cumberland and Hancock Counties during July.

In Kansas the brown wheat mite was beginning to hatch in local areas of central and western counties, and although populations were light, if the dry weather continues a general build-up can be expected. Light populations of eriophyid mites were found on volunteer wheat and western wheat grass in the same areas of Kansas.

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#### WEED CONTROL

(Continued from Page 65)

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(Continued from Page 63)

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#### PESTICIDES AND HEALTH

(Continued from Page 37)

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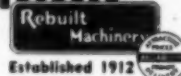
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## Tale Ends

A long-time NAC conventioneer—Jack Brunton—stopped in at the hotel Friday to greet many of his friends in the industry. Jack formerly served with Diamond Alkali Organic Chemicals Division in Newark,

N. J. and now is back with Kolker Chemical Co. in the same city.

It's easy to see who in the trade has time to spare for sharpening up the old golf game. Prize winners in

the annual NAC tournament included E. G. K. Meister of *American Fruit Grower*, John Nicholson of *Agricultural Chemicals*, Tom Morgan of *Soap and Chemical Specialties* and Bill Auchincloss of *O. P. D.* What is your agent doing in the editorial end of the business? Those space salesmen have the real racket.

\*\*\*\*\*

And, we can't help notice, they're getting more numerous all the time. Some of these optimistic publishers must have the feeling either that the field is a lot bigger than it really is, —or that everyone can find time to sit around all day long and read the trade magazines.

\*\*\*\*\*

Gopp's Casino had a minor miracle to report. All poker players are prepared to doff their hats when that fabulous hand—the Royal Flush—makes its appearance. Not only do they doff their hats. They pay too. The holder in this case was that well-known drawer to inside straights . . . old man Gopp himself. In spades.

\*\*\*\*\*

Sol Epstein, of Emulsol Corp., Chicago, made a big hit by greeting friends with personalized matchbooks, with their names in gold. He performed the feat on the spot by use of a unique stylus and a sheet of gold paper.

\*\*\*\*\*

We were beginning to wonder what had happened to organic farming. Less seems to have been heard on this subject over the past few years, following exposure of some of the myths on which it is based by agricultural experts. Then the *Saturday Evening Post* came out with the news that Franklin D. Roosevelt, Jr., who is earnestly striving to political position, is fanatical on the subject of organiculture. No chemicals, it is reported, are used on his 400 acre sheep farm in Dutchess County, N.Y. We are not a bit surprised to find him among the agricultural faddists, and we venture the safe guess that his farm operates on about as solid an economic basis as did the famed Christmas tree venture of his mother and brother Elliott.



### Mr. Postman, What Next?

**M**AGAZINES, magazines, magazines! And when would I find time to read all of them? I wonder now, do some of these publisher fellows know I'm running a business—and not a readin' library. Besides what I'm interested in finding out I can get all at once . . . all digested and assembled . . . once every month in *Ag. Chemicals*. And of course every one finds time to read *AC*.

## AGRICULTURAL CHEMICALS

175 FIFTH AVE.

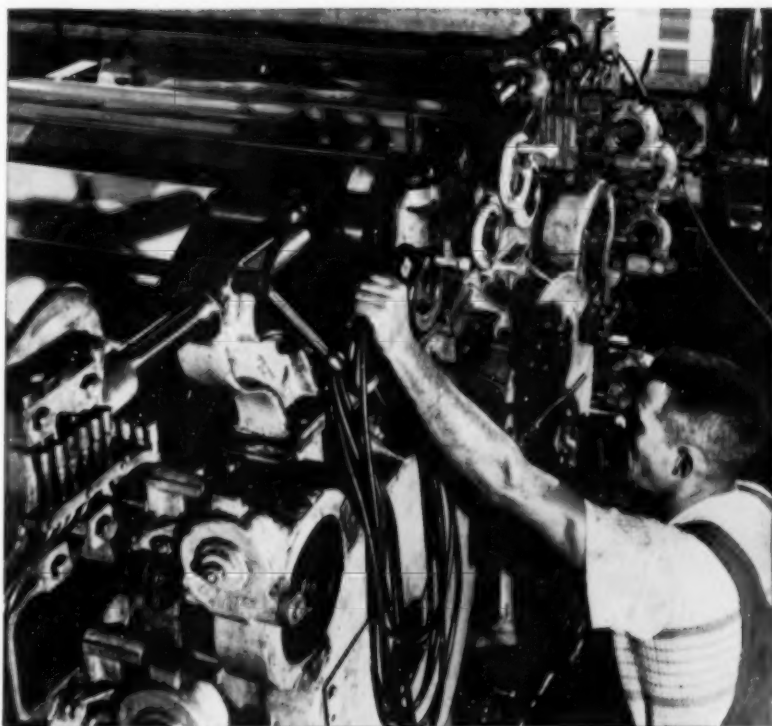
NEW YORK 10, N. Y.

Member Audit Bureau of Circulations

No. 3 of a series

**How Bemis makes  
GOOD multiwall bags  
for you**

*As with other types of printing, there is no substitute for experience in multiwall paper bag printing. A typical Bemis pressman is Wesley Pitcher, shown here at the 4-color press he operates at the Bemis plant in Peoria. Wesley went to work in the printing department 21 years ago and has been a pressman for 18 years.*



**Good bag printing requires *three* things . . . and Bemis has 'em!**

Good multiwall bag printing . . . the kind that makes your brand a star salesman . . . requires good presses, good plates and good workmen. And Bemis has 'em!

1. Specially designed presses . . . with features needed for *best* multiwall printing . . . are used.
2. Our own skilled, experienced plate makers make our printing plates . . . so we control quality every inch of the way.
3. Since we have been making and printing quality multiwalls for twenty-seven years, we have trained our pressmen to the point that they do, day in and day out, the best printing in the bag industry.

**Bemis**

General Offices—St. Louis 2, Mo.  
Sales Offices in Principal Cities



No. 1 of a series

How Bemis makes GOOD multiwall bags for you

**Use good paper . . . test it . . . prove it!**

When you buy multiwall for the various papers used in making Bemis multiwall bags, and so on, you are sure to receive those multiwall bags in the best paper from a variety of our mills. These multiwall bags are the best . . . if you doubt this, you can see them in the hands of our customers and they will tell you they are the best.

**Bemis**

No. 2 of a series

How Bemis makes GOOD multiwall bags for you

**Our artists help make your brand sell!**

When you buy multiwall for the various papers used in making Bemis multiwall bags, and so on, you are sure to receive those multiwall bags in the best paper from a variety of our mills. These multiwall bags are the best . . . if you doubt this, you can see them in the hands of our customers and they will tell you they are the best.

**Bemis**

# SUCCESSFUL FARMERS EVERYWHERE RELY ON TOXAPHENE...



**PENNSYLVANIA**—Elmer Young, Chatham, gets good control of spittlebugs on his alfalfa and clover with one toxaphene application each spring.



**TEXAS**—J. V. Davis, Rt. 1, Waco, finds that automatic early-season poisoning with toxaphene gets his cotton off to a good start.



**MISSISSIPPI**—Joe McCaughan, Sherard, depends on toxaphene to protect cotton, also uses it to stop worm infestations on wheat and barley.



**GEORGIA**—Royce Calhoun, Vienna, says, "Toxaphene lasts longer and does a better job than any dust we've used. In our county, more people are going to toxaphene . . ."



**MARYLAND**—Lester Tucker, Jr., Rt. 4, Elkton, uses toxaphene spray to protect his clover from spittlebugs, a serious threat to hay production in many states.



**LOUISIANA**—T. A. Calloway, Bosco, depends on toxaphene sprays for control of thrips; says "We also obtained excellent results in the use of toxaphene dust to control outbreaks of cutworms on our oats."



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**ARKANSAS**—Marvin McCalman grows cotton in the Red River bottoms near Bradley. "For the last several years," he reports, "I found toxaphene has been very effective in control of over-wintering weevils, fleahoppers, and thrips . . ."